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# **Conservation of Tropical Forests and Biological Diversity In Indonesia**

**Submitted in accordance with Foreign Assistance Act Sections 118/119**

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Prepared for: USAID Indonesia  
Jl. Medan Merdeka Selatan No. 3-5  
Jakarta, Indonesia 10110

Prepared by: Carey Yeager, Ph.D

Based on previous work by: Chip Barber, Ph.D.  
Mary Melnyk, Ph.D.  
Steve Rhee, M.E.Sc.  
Tim Brown, Ph.D.  
Reed Merrill, M.Sc.  
Russ Dilts, Ph.D.  
Stacey Tighe, Ph.D.

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<b>Table of Contents</b>	i
List of Tables and Figures	ii
Executive Summary	iii
A. Introduction	1
Purpose	1
Background	2
Why Indonesia’s Environment Matters to the United States	2
B. Legislation and Institutional Structures Affecting Biological Resources	3
Legislation	3
Government Institutions	6
Donors and International Organizations	7
Non-governmental Organizations	8
Private Sector	8
Recent Policy and Political Developments	8
C. Biophysical and Ecoregional Characteristics	10
Biophysical Characteristics	10
Ecoregions	10
D. Current Status of Tropical Forests and Biodiversity	15
Tropical Forest Status and Management	15
Biodiversity Status and Management	20
E. Assessment of Threats to Tropical Forests and Biodiversity	24
Interactions Amongst Threats	33
F. USAID’s Current Activities	35
G. Actions Necessary to Conserve Biological Diversity and Tropical Forests	35
H. Meeting Conservation Needs: Current and Recommended Actions	36
Current Actions by USAID and USG partners	36
Extent to Which Current USAID Actions Meet Needs	38
Threats from Current and Proposed USAID activities	38
Activity Selection and Recommended Actions to Mitigate Threats	38
Opportunities for Linkages	41
Extent to Which Proposed USAID Actions Meet Needs	42
I. Bibliography	43
J. Appendices	47
I. Abbreviations and Acronyms	48
II. List of Species Priorities for GOI	50
III. List of Invasive Species	54
IV. USAID Current Activities	55
V. Anthropogenic threats to biodiversity and forests in Indonesia	60
VI. Actions Deemed Necessary by GOI to Conserve Biological Diversity and Tropical Forests	64
VII. USAID engagement in major activities identified by IBSAP to mitigate threats.	68
VIII. Potential Actions to Mitigate Threats	71
IX. Potential Activity Descriptions	79
X. List of Contacts	82

## **List of Tables**

Table 1.	National Government Institutions with some responsibility or authority for activity.	6
Table 2.	Mangrove Area (ha) by island in Indonesia.	13
Table 3.	Forest Cover Status by Forest Classification (2005 Data).	16
Table 4.	Forest Cover Status by Island and Forest Classification (2005 Data).	17
Table 5:	Structure and Extent of Indonesia's Protected Areas System under the Ministry of Forestry as of 2007.	20
Table 6.	Structure and Extent of Indonesia's Protected Areas System under the Ministry of Marine and Fisheries as of 2005.	21
Table 7.	Total number of species at risk of extinction.	23
Table 8.	Total Number of Species and Endemism by Major Taxonomic Group.	23
Table 9.	Ranking based on biodiversity and forest cover.	24

## **List of Figures**

Figure 1.	The Coral Triangle	14
Figure 2.	Indonesia's Forest Cover	19
Figure 3.	Indonesia's Decrease in Forest Cover from 2000 - 2005.	19
Figure 4.	Location of Significant Mineral Deposits in Indonesia	30
Figure 5.	Drivers and Underlying Causes of Forest Degradation and Deforestation in Indonesia	39
Figure 6.	Conceptual Model	41

## Executive Summary

**Purpose.** USAID Indonesia is required under Sections 118 and 119 of the Foreign Assistance Act (FAA) of 1961 to carry out a background assessment of the status of forests and biological diversity in Indonesia to ensure that its new strategic plan and programmatic activities address threats.

**Biodiversity Status.** Indonesia is considered a mega biodiversity country, and is ranked first in the world for the number of mammals, palms, swallowtail butterflies, and parrot species (World Bank, 2001). It contains 10% of the world's flowering plant species, 18 Global 200 ecoregions (World Wildlife Fund [WWF]), 24 Endemic Bird Areas (Bird Life International), and has the highest coral species richness (Suharsono, 1998) in the region. Indonesia has high levels of endemism (species found only in that area). The number of species at risk of extinction is increasing significantly.

**Forest Status.** Tropical forest cover is still extensive, particularly in Papua, North Sumatra, and Kalimantan. However forest cover is rapidly declining, threatening biological diversity, the provision of ecosystem services, and the economic base. GOI policy to boost forest production through the timber concession and plantation systems has generated significant revenues for development, but has also resulted in significant forest degradation. Sumatra and Kalimantan have lost the greatest areas of forest cover. As recently as 1950, some 150 million ha (84%) of Indonesia was covered in natural forest, mostly primary forest (GFW/FWI, 2002). As of 2005, approximately 90 million ha remained in primary or secondary forest. Since 1995, more than 20 million hectares of forest have been cleared, resulting in one of the highest rates of tropical forest loss in the world. Indonesia has been identified as the world's third-largest emitter of GHGs contributing to climate change due its high deforestation rate, particularly in lowland carbon-rich peat forests (World Bank et al., 2007). Approximately 80% of Indonesia's emissions are from the forestry sector.

**Protected Areas Status.** Indonesia has allocated over 10% of its land area as Protected Areas (PAs), including a network of 495 terrestrial protected areas covering 22.7 million hectares and 40 marine PAs covering 11.6 million ha under the Ministry of Forestry, plus another 69 conservation areas totaling 3.4 million ha under the Ministry of Marine and Fisheries. The current PA system suffers from numerous problems, including insufficient funding and lack of capacity for sustainable management. Current PA size and distribution do not protect viable populations of threatened and endemic species long term, and spatial plans do not incorporate connecting corridors allowing for migration. This is particularly important as climate change is beginning to affect the range and distribution of species.

**Coral Reef Status.** Indonesia's coral reefs have suffered extensive degradation over the past 30-40 years. A survey conducted in 2000 concluded that less than 30% of coral reefs remained in good condition (World Bank, 2004), while a 2002 study warned that 86% were under either high or medium levels of threat, with fully 46% highly threatened. Cesar et al. (1997) modeled the economic effects of reef degradation in Indonesia and

estimated that the loss to the fishery sector from reef degradation and over fishing to be \$410,000 per km<sup>2</sup>. Extrapolations from studies suggest that Indonesia has already lost 40% of its reef fisheries resource, yielding an estimated economic loss of \$30 billion over 25 years.

**Freshwater Systems Status.** The majority of freshwater areas are polluted from sewage inputs, household waste, and agricultural runoff and siltation. Industrial pollution is common in urban areas. In several areas (e.g., Sulawesi, Kalimantan) there is heavy metal poisoning (mercury) from unregulated community gold mining. Invasive species, such as tilapia, elephant grass, and water hyacinth, are replacing native species communities and drying up streams. There is high seasonal variability in available water supplies, with extended or unpredictable dry seasons increasingly impacting the poor through crop failures, longer distances that must be covered to reach water supplies, and higher prices of purchased water from vendors. Extraction exceeding recharge rate is leading to aquifer depletion with subsequent saltwater intrusion, and both land use changes and climate change are leading to freshwater system degradation.

**Threats.** Indonesia faces a wide array of threats to its tropical forests and biodiversity. Climate change, land conversion, large-scale forest fires, hunting, pollution, invasive species, and are some of the direct threats. Underlying (or indirect) causes of environmental degradation are also numerous and include weak institutions, poor policies, economic demand, poor governance, population growth, lack of information, culture, and other factors identified in the Threats Analysis (Appendix V). USAID programs address the majority of the major threats to tropical forests and biodiversity, and are providing support for over half of the major activities identified by the Government of Indonesia.

### **Extent to Which Proposed USAID Actions Meet Needs**

The Coral Triangle Initiative and a proposed new forestry initiative will address many of the highly ranked threats to biodiversity (marine and terrestrial) and forestry. USAID activities will support sustainable resource use and best management practices, reductions in pollution and destructive fishing practices, reef restoration, improved local governance, appropriate spatial planning, financial incentives (e.g., Payment for Ecosystem Services, voluntary carbon credits), and private sector partnerships.

The Coral Triangle Initiative will substantially increase USAID's geographic impact in the marine sector. A new integrated spatial plan for Papua province will help conserve a significant area of frontier forest and its biodiversity. The new forestry initiative will most likely focus on large forest blocks, and lowland peat forest, an area important for biodiversity and reducing carbon emissions.

Implementation of these activities will make a significant contribution to conserving Indonesia's biodiversity and forests in specific sites. At current planned funding levels, USAID Indonesia can not meet Indonesia's need, and must leverage other donors, the GOI, private sector, NGOs and communities to achieve USAID's objectives. With additional funds, USAID could build substantially upon successful programmatic efforts to increase impacts in selected target areas.

### **Activity Selection and Recommended Actions to Mitigate Threats**

USAID has limited resources and will need to prioritize geographic and national level activities depending on funding levels and leverage opportunities. USAID activities should provide technical assistance and capacity building in support of sustainable resource use and best management practices, reductions in destructive fishing practices, improved local governance, appropriate spatial planning, and financial incentives (e.g., Payment for Ecosystem Services, voluntary carbon credits).

With respect to development of site-based activities, USAID should focus on the “Coral Triangle” and the three geographic terrestrial areas with the highest levels of biodiversity and remaining forest cover. These were identified as Papua, Kalimantan, Sumatra, and Sulawesi. In addition, there should be a bias towards lowland peat swamp forest where possible, given its importance with respect to threatened biodiversity, GHG emissions, and climate change. The Lacey Act provides a good entry point into forest governance issues and the reduction of illegal logging.

In addition to site based activities, USAID should invest in activities with good potential for large scale impact, that address multiple threats, and build upon USAID’s strengths (as identified by partners) in capacity building, training, public information access, developing market incentives, and planning. USAID should also take advantage of growing private sector interest in the environment sector due to the new Corporate Social Responsibility legislation.

Specific activities finally selected should be based on stakeholder impact and engagement analyses to ensure effectiveness in reducing threats, and requires further site specific analyses (including threats). Demand for activities is also site specific, and needs to be further assessed. Integrating national, regional, and site based activities, if possible, can significantly reduce or mitigate threats.

## A. Introduction

### *Purpose of FAA 118/119 Report*

USAID Indonesia is required under Sections 118 and 119 of the Foreign Assistance Act (FAA) of 1961 to carry out a background assessment of the status of forests and biological diversity in Indonesia to ensure that its new strategic plan and programmatic activities address threats. The legislation states:

“FAA Section 118 (e) Country Analysis Requirements. Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of:

- (1) the actions necessary in that country to achieve conservation and sustainable management of tropical forests, and
- (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.”

“FAA Section 119 (d) Country Analysis Requirements. Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of:

- (1) the actions necessary in that country to conserve biological diversity, and
- (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.”

Congress mandated the FAA 118 and 119 analyses to support sustainable development, and these analyses have a number of benefits to the Mission. These benefits include:

- saving time and money by giving the Mission a “heads up” about possible environmental compliance problems under Regulation 22 CFR 216;
- helping the Mission identify opportunities for using Congressional Earmarks for biodiversity or tropical forest conservation;
- identifying opportunities for increasing the sustainability of SOs in other development sectors (such as democracy and governance, economic growth, health, disaster preparedness, and conflict mitigation and management); and,
- meeting USAID’s legal requirements to complete these analyses.

A comprehensive review of Indonesia’s biodiversity, ecology, and tropical forest status was conducted in 2004 (Rhee, et al., 2004). An analysis of opportunities and recommendations for a strategy were made for the USAID Natural Resources Management Program in Indonesia in January, 2008 (Barber and Melnyk, 2008). This report builds upon these two technical documents, updates critical analyses, and addresses emerging threats and opportunities for the Mission. This report is based upon key documents, interviews with partners and donors, and the outcome of a multi-stakeholder consultation (facilitated forestry workshop held in November 2008). Statistics come from the Ministry of Forestry ([http://www.dephut.go.id/Halaman/Buku-buku/2006/Statistik\\_06/Statistik\\_06.htm](http://www.dephut.go.id/Halaman/Buku-buku/2006/Statistik_06/Statistik_06.htm)) and the Badan Pusat Statistik (BPS-Statistics Indonesia) ([http://www.bps.go.id/site\\_map/](http://www.bps.go.id/site_map/)), a Non-Departmental Government Institution directly responsible to the President, unless otherwise noted.



## ***Background***

Indonesia is considered a mega biodiversity country, and is ranked first in the world for the number of mammals, palms, swallowtail butterflies, and parrot species (World Bank, 2001). It contains 10% of the world's flowering plant species, 18 Global 200 ecoregions (World Wildlife Fund [WWF]), 24 Endemic Bird Areas (Bird Life International), and has the highest coral species richness (Suharsono, 1998) in the region. Indonesia is a large archipelago, comprised of approximately 17,000 islands, with high levels of endemism (species found only in that area). Tropical forest cover is still extensive, particularly in Papua, North Sumatra, and Kalimantan. However forest cover is rapidly declining, threatening biological diversity, the provision of ecosystem services, and the economic base. Large scale deforestation has led to enormous emissions of greenhouse gases; accounting for 80% of national emissions contributing to climate change.

The Indonesian population of 227.8 million is distributed unevenly, with approximately 54% concentrated on the island of Java. The majority of the population is disadvantaged, with over 140 million living on less than \$2 per day (average annual income is \$814 per person). Educational levels are low (fewer than 40% of children enrolled in school complete 9 years of basic education). Malnutrition is common, nearly one-third of the population lacks access to clean water, and preventable, poverty-related diseases, such as diarrhea, cause hundreds of thousands of deaths each year. Population growth rates have been decreasing, but are still above replacement levels. The current growth rate is approximately 1.25%, and this is projected to fall to 0.84% by 2025. The majority of the population is Muslim.

Indonesia has a difficult investment and regulatory framework, burdened by low productivity and systemic corruption. Economic opportunities are few for the impoverished; small scale and microenterprise have only grown approximately 2.2% from 1996 to 2004 in Indonesia. The large scale manufacturing industry shrunk 3.2 % from 2001 to 2004 and will presumably shrink further given the current global financial crisis. The economy is largely dependent upon the natural resource base; it has abundant natural resources and access to key shipping lanes.

It has been estimated that 60% to 95% of Indonesians live within 100 km of the coast (World Resources Institute, 2001), with approximately 80% engaging in marine resource-dependent activities, such as fishing and mariculture or related activities. The total product of coastal and marine economic activities in Indonesia is estimated at 15% of GDP, providing employment for some 28.5 million people. Since coral reefs are habitats for some 90% of the fish caught by coastal fishers, and since fish compose some 60% of the average Indonesian's animal protein intake, the health of coral reefs and associated ecosystems is directly linked to basic nutrition, health and community welfare (World Bank 2004). A 2002 study concluded that the overall annual economic value of Indonesia's reefs was over \$31,000 per km<sup>2</sup>, totaling \$1.6 billion (Burke et al., 2002).

The Government is democratic; free and fair elections have been held for the past decade since the fall of President Soeharto in 1998. Regulatory control has been decentralized with uneven success across provinces and districts. Democratic institutions remain weak

and unprepared to carry out essential reforms, and political parties have not provided effective democratic channels for constituent demands. There is growing frustration with the government's inability to control major issues such as corruption and conflict, although progress has been made in improving the enabling environment. The current Government has made a commitment to addressing environmental issues, including climate change.

### ***Why Indonesia's Environment Matters to the United States***

Indonesia is the world's fourth most populous nation; it contains the Earth's third largest expanse of tropical forest, vast coral reefs that constitute the global center of marine biological diversity, and major fossil fuel and mineral resources. Natural resources from this rich natural endowment – timber and non-timber forest products, oil and gas, gold, copper and other minerals, fish and other marine products – are centrally important to the future economic progress, stability and security of the country. Conversely, wasteful, haphazard and often-illegal depletion of these resources undermines prospects for economic growth, contributes to corruption, strengthens organized crime, depletes globally-important biological resources, and serves as a flashpoint for social and ethnic conflict.

Indonesia's economic progress, stability and security are, in turn, vitally important to the United States. Indonesia is Southeast Asia's largest economy, possesses the world's largest Moslem population, encompasses some of the most important shipping lanes on the planet, and is the world's third-largest democracy. Like the US, Indonesia has been the target of terrorist attacks, and is a key regional ally in efforts to combat global terrorism.

The US and Indonesia also have an important economic relationship. The stock of US foreign direct investment in Indonesia was \$9.9 billion in 2005 (latest data available), while US goods and private commercial services exports to Indonesia in 2006 totaled \$4.3 billion, and US imports from Indonesia totaled over \$13.7 billion (USTR, 2007).

In short, the fate of the natural resource base underlies Indonesia's future stability and prosperity, as well as being a key global environmental priority. US interests in the conservation and sustainable use of Indonesia's natural resources are closely linked to US interests in the totality of our bilateral relationship, and US general foreign policy interests in the East Asian region.

## **B. Legislation and Institutional Structures Affecting Biological Resources**

### ***Legislation***

The Government of Indonesia has ratified numerous important international treaties, and issued a number of regulations, laws, and Presidential decrees, making biodiversity conservation and the environment a national priority. These include:

### **International Treaties**

- a) The Convention on Biological Diversity
- b) The Convention on Climate Change
- c) The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- d) The Convention on Wetlands of International Importance especially as Waterfowl Habitat, Ramsar
- e) The Convention for the Protection of the World Cultural and Natural Heritage

### **Laws**

- a) Law No. 5, 1967 on Basic Stipulations on Forestry
- b) Law No. 4, 1982 on Basic Stipulations on Environmental Management
- c) Law No. 5, 1985 on Fisheries
- d) Law No. 9, 1985 concerning Conservation of Natural Resources and the Ecosystem
- e) Law No. 5, 1990 on Conservation of Biological Resources and Their Ecosystems
- f) Law No. 5, 1994 Concerning Biodiversity
- g) Law No. 23, 1997 Concerning Environmental Management
- h) Law No. 41, 2000 Basic Forestry Law (replaces Law 5, 1967)
- i) Law No. 19, 2004 Forestry Law (some articles replace Law No. 41, 2000)
- j) Law No. 31, 2004 Fishery Law
- k) Law No. 7, 2004 Water Resource Law
- l) Law No. 4, 2006 Legitimization of International Treaty on Plant Genetic Resources for Food and Agriculture
- m) Law No. 16, 2006 Agriculture, Fishery and Forestry Extension System
- n) Law No. 26, 2007 Spatial Planning
- o) Law No. 27, 2007 Coastal Zone and Small Islands Management
- p) Law No. 18, 2008 Waste/Garbage Management

### **Government Regulations**

- a) Government Regulation No. 28, 1985 on Forest Protection
- b) Governmental Regulation No.29, 1986 concerning Environmental Impact Analysis (AMDAL)
- c) Government Regulation No. 51, 1993 on Environmental Impact Analysis (AMDAL)
- d) Government Regulation No. 20, 1990 requiring water pollution control
- e) Governmental Regulation No.18, 1994 concerning Natural Resources Tourism in the Use Zone of National Parks, Community Forest Parks and Natural Resources Parks
- f) Government Regulation No. 8, 1999 Wild Crop/Animal Utilization
- g) Government Regulation No. 4, 2001 on Environmental Degradation in Relation to Forest/Land Fire
- h) Government Regulation No. 34, 2002 Forest Utilization permit/license
- i) Government Regulation No. 45, 2004 on Forest Protection

- j) Government Regulation No. 6, 2007 on Ecosystem Restoration Concessions
- k) Government Regulation No. 3, 2008 Forest Management Plan

#### **Presidential Decrees**

- a) Presidential Decree No.43, 1978 concerning Ratification of CITES (Convention on International Trade of Endangered Species of Wild Flora and Fauna)
- b) Presidential Decree No. 32, 1990 on Management of Protected Areas
- c) Presidential Decree No. 23, 1990 establishing the Environmental Impact Management Agency (BAPEDAL)
- d) Presidential Decree on ratification of Various Biological Species
- e) People's Consultative Assembly Decree No. 9, 2001 on Agrarian Reform and Natural Resources Management

#### **Other Laws (and draft laws) that impact the environment**

- a) Law No. 5, 1983 on Indonesia's Exclusive Economic Zone
- b) Law No. 24, 1992 on Spatial Use Management
- c) Law No. 22, 1999 on Regional Governance
- d) Law No. 25, 1999 on Fiscal Balance between Central and Regional Governments
- e) Law 32, 2004 Regional Administration and Law
- f) Law 33, 2004 Fiscal Balance between the Central Government and Regional Governments
- g) Law no. 40, 2007 Corporate Social Responsibility
- h) Law No. 14, 2008 on Freedom of Public Information
- i) Draft Law on Natural Resource Management

Indonesia's legal system is quite complex. In August 2000 the MPR (People's Consultative Assembly) issued the following official hierarchy (in order of legal precedence) of legislation to clarify the status of various legislation types:

- 1) 1945 Constitution (Undang-Undang Dasar 1945)
- 2) MPR Resolution (Ketetapan MPR)
- 3) Law (Undang-undang)
- 4) Government Regulation Substituting a Law (Peraturan Pemerintah Pengganti Undang-undang)
- 5) Government Regulation (Peraturan Pemerintah)
- 6) Presidential Decree (Keputusan Presiden)
- 7) Regional Regulation (Peraturan Daerah)

Overlaps and conflicts amongst laws and decrees often occur. Although the fundamental principle of the legislative hierarchy is that lower legal regulations may not conflict with higher regulations; Ministerial and Gubernatorial decrees are not mentioned, leaving their status unclear (LLRX, 2008).

There are numerous inconsistencies in the legal framework. These range from the use of multiple terms to define protected areas and conservation objectives to conflicts in actual authorized uses (for example mining in nature reserves).

Indonesia has increased its transparency (Law 14/2008) and does publish its laws and regulations on public websites: [www.setneg.go.id](http://www.setneg.go.id) and <http://www.hukumonline.com>. In addition, Law 32/2004 clarifies the legal status of regional regulations, and requires that all laws and regulations directly related to autonomous regions must refer to, and conform to, this law (World Bank, 2006).

### ***Government Institutions***

Apart from the Executive and Legislative branches, the major Government Ministries and Departments relevant to Indonesia's forestry and biodiversity include: the Ministry of Forestry, the Ministry of Environment, the Directorate General of Forest Conservation, the Ministry of Marine and Fisheries, the Ministry of Agriculture, the Ministry of Finance, the National Police, the Navy, the Ministry of National Development Planning, National Land Tenure Agency, the Ministry of Transportation, the Ministry of Mining and Energy, the Ministry of Tourism, the Ministry of Trade, the Institute of Sciences, and the Ministry of Public Works. There are local level equivalents of all these ministries and departments, plus provincial and district administrations. Sectoral offices report to the local executive branch, as opposed to the Ministry at the national level; thus there is no linear flow of information or reporting relationships within a sector.

The roles and responsibilities of Indonesia's Government Institutions are often ill-defined, with major inter-institutional overlaps (see Table 1). This is further complicated by decentralization; with frequent disputes concerning revenue distribution and land use between local and central government. This frequently creates barriers to effective and efficient implementation of necessary management actions, and needed programs.

**Table 1. National Government Institutions with some responsibility or authority for activity.**

<b>Activity</b>	<b>National Government Institution</b>
<b>Biosafety</b>	
Invasive Species	Customs, Ministries of: Forestry, Environment, Agriculture, Marine&Fisheries
Prevention/control	Ministries of Health, Agriculture, Forestry, Environment, Marine&Fisheries
Emergency Response	Ministries of: People's Welfare, Public Works, Transportation, Energy and Mining, Forestry, Environment, Disaster Management Agency
<b>Management</b>	
Ecosystems, species	Ministries of: Forestry, Environment, Agriculture, Marine&Fisheries, National Development Planning
Sustainable Use	Ministries of: Forestry, Environment, Agriculture, Marine&Fisheries, Tourism, National Development Planning, Trade
Genetic Diversity	Ministries of: Forestry, Environment, Agriculture, Marine&Fisheries, National Development Planning
Enforcement	Police, Navy, Ministries of: Forestry, Environment, Agriculture, Marine&Fisheries, Environmental Impact Management Agency

<b>Activity</b>	<b>National Government Institution</b>
<b>Rehabilitation</b>	
Terrestrial habitat/ watersheds	Ministries of Forestry, Agriculture, Marine&Fisheries
Species	Institute of Sciences, Ministries of: Forestry, Environment, Agriculture, Marine&Fisheries
Environmental Services	Ministries of: Forestry, Environment, National Development Planning, Public Works
Coral Reef/Marine	Ministries of: Forestry (PHKA), Marine&Fisheries, Environment, National Development Planning
<b>Knowledge</b>	
Research	Institute of Sciences, Universities, Ministries of: Forestry, Environment, Agriculture, Marine&Fisheries, Technology, Agency for the Assessment and Application of Technology
Inventories and scientific collections	Institute of Sciences, Universities, Ministries of Agriculture, Forestry
Environmental Education, Awareness and Outreach	Department of Education, Ministries of: Forestry, Environment, Agriculture, Marine&Fisheries
Training and Education	Universities, Department of Education, Ministries of: Forestry, Environment, Agriculture, Marine&Fisheries
<b>Legal and Administrative</b>	
Development Planning	Ministries of: Forestry, Environment, Agriculture, Marine&Fisheries, Tourism, National Development Planning, Trade, Health, public Works, Mining&Energy, Transportation
Spatial Planning	Ministries of: National Development Planning, Forestry, Agriculture, Agrarian Agency, Ministry of Public Works, National Land Tenure Agency
Financing	Ministries of: Finance, Forestry, Environment, Marine&Fisheries, Director General of Forest Conservation, Executive (President, Governor, Mayor), Legislative
Forestry and biodiversity Policy and legislation	Ministries of Law, Justice&Human Rights, Forestry, Environment, Agriculture, Marine&Fisheries, National Development Planning, Executive (President, Governor, Mayor), Legislative

Decentralization has empowered district (*kabupaten*) governments (and, in the case of Papua and Aceh, provincial governments, under the “special autonomy” provisions applicable to those regions), who now have opportunities to take NRM decisions and allocate land and resources in ways not possible in the past. Democratization has also begun to make them more accountable to their constituencies. In some areas, local leaders have shown signs of strong environmental leadership, and local institutions –both in government and civil society – are beginning to develop stronger capacities

Despite the ongoing process of decentralization, the central government still plays an important role in establishing policy frameworks and economic incentives that influence natural resources conservation and use. In many cases, the success and sustainability of site-level natural resources interventions are often dependent on decisions and actions taken at the national level in sectors such as trade, energy and transportation infrastructure.

### ***Donors and International Organizations***

There are numerous donors (bilateral, multilateral, and private foundations) and international organizations working in the forestry and biodiversity sector in Indonesia.

Some of the major players include: The World Bank, ADB, GEF, UNESCO, UNDP, UNEP, ITTO, Danida, GTZ, DFID, CIDA, Norway, France, European Commission, AusAid, Dutch Embassy, JICA, Ford Foundation, CIFOR, and ICRAF. Several of these donors are providing assistance in the forest and biodiversity sector on an order of magnitude greater than USAID. There is an Environment Coordination Group which meets regularly to help coordinate efforts; however there continues to be overlap and competing agendas. As of November 2008, many donors are also in the design phase, and have not yet finalized funding levels, specific sites, and implementing partners. However, almost all donors have activities planned to address carbon emissions from the forestry sector, primarily through policy support or pilot demonstrations of the REDD (Reduced Emissions from Deforestation and Forest Degradation) mechanism, with sale of carbon units financing avoided forest deforestation/degradation, or through satellite forest monitoring and information systems to support carbon accounting needs for REDD.

### ***Non-governmental Organizations***

Indonesia has numerous non-governmental organizations, ranging from small local groups, to national or international. Some of the better known NGOs with environmental portfolios include: CARE, World Education, The Nature Conservancy, Wetlands International, OFI, WARSI, Pelangi, ICEL, World Wide Fund for Nature, Conservation International, Fauna and Flora International, Wildlife Conservation Society, Bird Life, WALHI, TELAPAK, Forest Watch, and KEHATI. Organizational capacity varies widely; international organizations generally have better developed financial and administrative systems in place, better technical skills and capacity, and are valued advisors to the government and private sector, while local NGOs generally have better knowledge of “on the ground” conditions, feasibility of incentives and disincentives, and high motivation levels. In many places, however, local NGOs have greater credibility and stronger community ties than either government agencies or international NGOs do.

### ***Private Corporations***

Private investment now dwarfs donor funding in the NRM sectors in Indonesia, and is often the primary force driving land and resource decisions. The private sector is more diverse than previously, and global market pressures to adopt sustainable practices are stronger.

International corporations are numerous, and include the mining, gas, commodity producers (timber, palm oil), and food industries (e.g., Exxon, Cargill, Wilmar, International Paper, KRAFT, Agincourt, BHP Billiton, Starbucks, Freeport, BP, Nike, Coca Cola and Nestle’s). Large corporations are legally required to provide funds for local development assistance through their CSR program (corporate social responsibility), and generally do this through their own foundations or grants to the NGO community. USAID has entered into public private partnerships with many forest sector companies through public private partnerships (GDAs) on illegal logging, including companies such as Home Depot, Lowes, Xerox, and the AFPA. Legal timber for tsunami reconstruction was promoted through the Timber for Aceh initiative, a public private partnership between private sector, WWF, and the GFTN. USAID has also addressed community development activities through GDAs with BP and Coca Cola.

### ***Recent Policy and Political Developments***

- There has been measurable progress in the consolidation of democratic institutions, at both the central and local level; although progress varies from district to district, and among various sectors of the economy.
- There has been a strengthening of political will by the Government of Indonesia to confront both the symptoms of environmental decline – such as illegal logging and fishing – and the underlying causes, such as corruption and the involvement of the military in natural resource exploitation.
- Indonesia's significant emissions of greenhouse gases, primarily from deforestation, have propelled climate change and forest loss into the forefront of Indonesian policy and media debate. This attention was reinforced by Indonesia's hosting the 13<sup>th</sup> Conference of the Parties to the UN Framework Climate Change Convention (COP-13) in December 2007, where the inclusion of forest issues in the negotiations for a successor regime to the Kyoto Protocol was a significant outcome.
- Largely as a result of the climate change issue, Indonesian policymakers are increasingly addressing environmental factors in economic policymaking. In September 2007, President Yudhoyono launched development of a national "low carbon growth strategy".
- International market demand for verified sustainably-produced natural resource commodities (e.g. timber, oil palm, aquarium fish) has increased in the past few years, encouraged in some cases, by government policies in importing countries (e.g. EU and Japan, with respect to timber). This market pressure has strengthened the "business case" for investing in legal, sustainable production for many firms operating, or considering investing, in Indonesia.
- Indonesia is playing an increasingly influential role in a variety of multilateral environmental agreements and regional processes. Apart from the UNFCCC, these include the UN Forum on Forests (where Indonesia is the 2007-2009 Chair), the Asia Forest Partnership, the East Asia Forest Law Enforcement and Governance (FLEG) process, the tri-national "Heart of Borneo" conservation initiative (with Malaysia and Brunei) and, most recently, the six-nation Coral Triangle Initiative (CTI) launched by President Yudhoyono in mid-2007.
- Changes in law and policy over the past decade have strengthened local and indigenous community rights and roles in natural resources management; a prerequisite for effective and equitable natural resource interventions in most parts of the country.
- A wide variety of bilateral, multilateral and private donors are starting to re-engage in the natural resources sector in Indonesia, after several years in which donor support in this area waned.
- The recent large global push into biofuels production led to a food crisis, as food crops were diverted to the alternative energy market, and oil palm plantation development expanded, driven by significantly higher prices, replacing both natural forests and agricultural lands.
- Energy prices soared globally in 2008, diverting financial resources of both households and governments to increasing transportation and shipping costs, as well as retail prices.



- The financial crisis originating in the US from bad subprime mortgages, housing price declines, and bank failures spread across Europe to Asia. This has led to decreased credit availability for business and households, decreased international market demands for Indonesian products, and devaluation of the rupiah, as well as reduced funding available for investment.

### **C. Biophysical and Ecoregional Characteristics**

#### ***Biophysical Characteristics***

Indonesia's climate is typical of tropical regions located along the equator; hot and humid, with high rainfall levels found in low lying areas. Montane regions are cooler, and there is one ice-capped peak in Papua. Based on the cities of Jakarta, Ujung Padang, Medan, Padang, and Balikpapan, the average low temperature is 22.8C and the high is 30.2 C (range from 15 to 36 degrees C). Humidity levels are high, ranging from 61% to 95% in Jakarta. Average rainfall has been 218.4 mm per month. November through April has been the "wet" season, and May through October has been generally dry, with slight variations in its regional sub-climatic zones. Rainfall patterns, however, appear to be fluctuating due to climate change and have become more variable.

Indonesian topography ranges from sea level (0 m) to a height of 4,884 m (Puncak Jaya). The Wetar Basin, east of the Banda Sea, is a subduction zone, and is -7440 m. Indonesia is situated along some major fault lines and has high levels of seismic activity (earthquakes), as well as volcanic eruptions.

Following the previous FAA 118/119 report, this report will use the following large bioregions defined on large scale faunal/floral groupings: Sundaland, Wallacea, and Sahul. Sundaland contains Sumatra, Java, Bali, Kalimantan (Borneo), and surrounding smaller islands. Wallacea contains Sulawesi, Nusa Tenggara, and Maluku. Sahul contains Papua and adjacent small islands.

#### ***Ecoregions***

The World Wildlife Fund has defined ecoregions as "a large area of land or water that contains a geographically distinct assemblage of natural communities that

- (a) share a large majority of their species and ecological dynamics;
- (b) share similar environmental conditions, and;
- (c) interact ecologically in ways that are critical for their long-term persistence."

WWF ecoregions are listed below for each major bioregion, and brief descriptions of major subdivisions are provided below.

#### **Sundaland Bioregion**

##### **Tropical and subtropical moist broadleaf forests**

- Borneo lowland rain forests
- Borneo montane rain forests
- Borneo peat swamp forests
- Eastern Java-Bali montane rain forests
- Eastern Java-Bali rain forests
- Mentawai Islands rain forests

- Southwest Borneo freshwater swamp forests
- Sumatran freshwater swamp forests
- Sumatran lowland rain forests
- Sumatran montane rain forests
- Sumatran peat swamp forests
- Sundaland heath forests
- Western Java montane rain forests
- Western Java rain forests

#### **Tropical and subtropical coniferous forests**

- Sumatran tropical pine forests

#### **Montane grasslands and shrublands**

- Kinabalu montane alpine meadows

#### **Mangroves**

- Sunda Shelf mangroves

#### **Freshwater and Marine**

- Sundaland Rivers & Swamps
- Andaman Sea

### **Wallacea Bioregion**

#### **Tropical and subtropical moist broadleaf forests**

- Banda Sea Islands moist broadleaf forests
- Buru rain forests
- Halmahera rain forests
- Seram rain forests
- Sulawesi lowland rain forests
- Sulawesi montane rain forests

#### **Tropical and subtropical dry broadleaf forests**

- Lesser Sundas deciduous forests
- Sumba deciduous forests
- Timor and Wetar deciduous forests

#### **Freshwater and Marine**

- Sulawesi Sea
- Central Sulawesi Lakes
- Banda-Flores Seas Marine Ecosystems
- Palau Marine

### **Sahul Bioregion**

#### **Tropical and subtropical moist broadleaf forests**

- Biak-Numfoor rain forests
- Central Range montane rain forests
- Japen rain forests
- Northern New Guinea lowland rain and freshwater swamp forests
- Northern New Guinea montane rain forests
- Southern New Guinea freshwater swamp forests

- Southern New Guinea lowland rain forests
- Vogelkop montane rain forests
- Vogelkop-Aru lowland rain forests

#### **Tropical and subtropical grasslands, savannas, and shrublands**

- Trans Fly savanna and grasslands

#### **Montane grasslands and shrublands**

- Central Range sub-alpine grasslands

#### **Mangrove**

- New Guinea mangroves

#### **Freshwater and Marine**

- New Guinea Rivers & Streams
- Lakes Kutubu & Sentani
- Northern New Guinea & Coral Sea Marine Ecosystem

A brief description of each major subdivision type is provided below:

#### **Tropical and subtropical moist broadleaf forests**

These forests contain:

- Lowland evergreen rainforests, which retain leaf cover year round, and have high rainfall levels (>2000 mm annually).
- Moist deciduous and semi-evergreen forests, with a warm summer wet season and a cooler winter dry season. Some trees in these forests drop some or all of their leaves on an annual basis.
- Montane rain forests found in mountainous areas with a cooler climate.
- Freshwater swamp forests are inundated with freshwater, either permanently or seasonally, and normally occur along river edges and around freshwater lakes.
- Peat swamp forests contain waterlogged soils with layers of acidic peat. Thick layers of peat sequester enormous amounts of carbon.

#### **Tropical and subtropical coniferous forests**

These forests contain various conifer species; their needles are adapted to lower levels of rainfall and greater variability in temperature than moist forest.

#### **Tropical and subtropical dry broadleaf forests**

These forests contain predominantly deciduous trees (trees drop leaves during drought); shedding leaves allows trees to conserve water during long dry seasons.

#### **Tropical and subtropical grasslands, savannas, and shrublands**

Grasses are the dominant species, although there may be scattered trees. Rainfall levels are lower than that found in rainforests. In Indonesia, caution should be taken, as large areas of tropical forest have been degraded and replaced by alang alang grass (*Imperata* sp.). Alang alang grass and bracken are fire adapted and may shift the original climax vegetation.

#### **Montane grasslands and shrublands**

High elevation grasslands and shrublands exhibit numerous adaptations to intense sunlight and cool, wet climates. These adaptations include waxy surfaces, rosette structures, and “hairy” leaves. These areas are extremely isolated, contain high levels of endemics, and are limited in extent.

### **Mangroves**

Mangrove forests are located in coastal brackish water, and exhibit specialized root structures to deal with high saline levels. Mangrove forests exhibit low plant diversity, but are highly productive and provide habitat for coastal marine flora and fauna including the endangered dugong and Indo-Pacific crocodile. Indonesia’s mangrove forests are the most biologically diverse (42 species), and remain the most extensive in the region, covering some 4.4 million hectares (see Table 2) with about 75% of the total amount concentrated on Papua, and nearly 400,000 hectares along the south and western coasts of Kalimantan. Mangroves appear to play an important role in seagrass bed ecology, with seagrass beds in proximity to mangrove having double the number and species of fish than seagrass beds located further away (Unsworth, et al., 2008).

**Table 2. Mangrove Area (ha) by island in Indonesia.**

ISLAND	MANGROVE AREA		
	Remaining as of 2006 (Landsat Images)	2006 Remaining in Good Condition	2006 Percentage Remaining in Good Condition
Sumatra	2,371,995.64	308,476.51	13.0
Java and Bali	118,622.70	9,083.27	7.7
Nusa Tenggara	58,997.73	19,311.05	32.7
Kalimantan	373,097.83	164,480.89	44.1
Sulawesi	29,621.56	9,338.86	31.5
Papua	1,438,421.00	1,152,412.00	80.1
TOTAL	4,390,756.46	1,663,102.58	37.9

Source: MoE State of the Environment 2008

### **Freshwater**

This ecoregion contains several diverse habitats, including rivers, lowland floodplains, and lakes. Indonesia has 843 lakes, 736 ponds, 1,341 reservoirs, over 200 large rivers and numerous streams, springs, and aquifers (MoE, 2006). Sixty-six species of freshwater fish are at risk of extinction, including the *bilih* fish (*Mystacoleus padangensis*) and the red arwana (*Sclerophages formosus*). More than half of these threatened fish species are endemic, with several species found only in an individual river basins or lakes.

### **Marine**

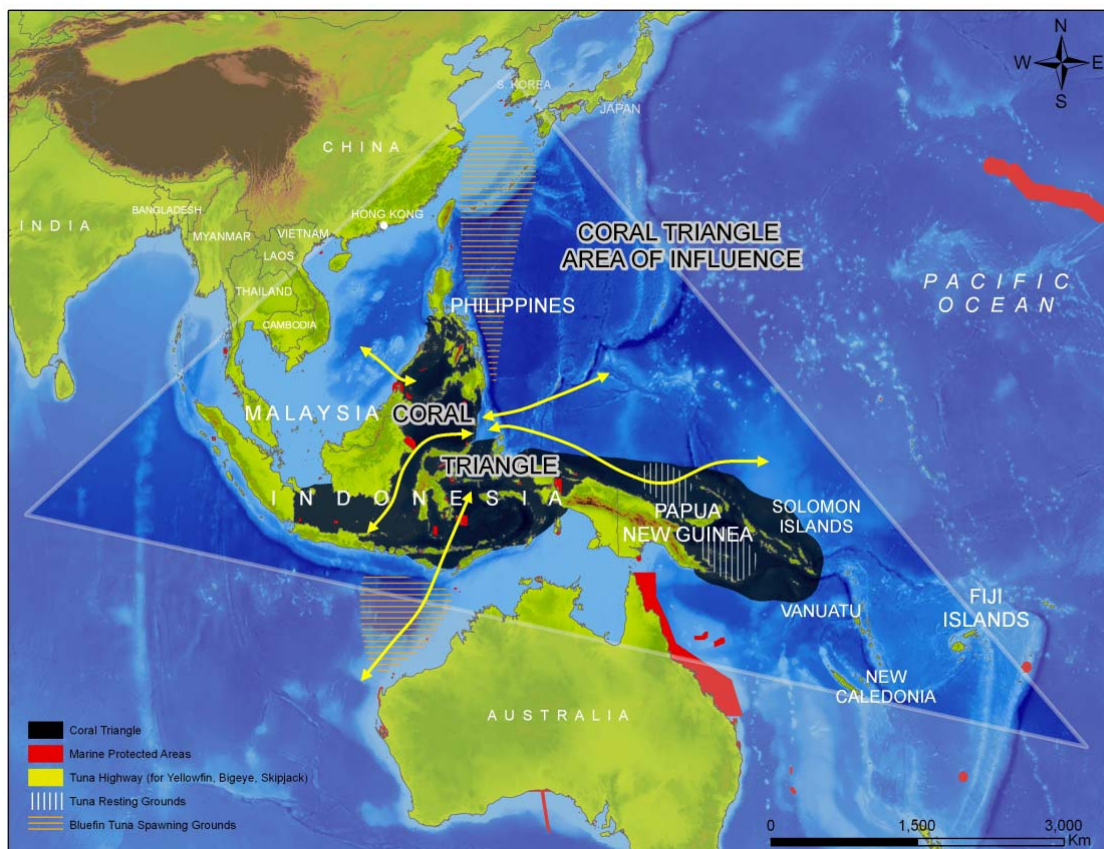
Indonesia has some 5.8 million km<sup>2</sup> of marine area (FAO, 1989), and its fisheries are highly diverse. The most diverse marine sites in Indonesia are those least impacted by humans. These are near Ambon and Sulawesi in eastern Indonesia, and they are about 20% more diverse than sites in the Java Sea, e.g., Pulau Kecil, G. Cembra and Karimunjawa) (Edinger et al., 1999). This can be attributed to both biogeographical differences and to greater over-fishing in the Java Sea. The region contains more than 2000 species of near shore fishes (Briggs, 1974), sea snakes, and marine mammals, and contains critical habitats and large rookeries of four species of sea turtles, all of which are

on the endangered species list. Seven marine sites in Indonesia have been recommended for certification as Natural World Heritage Marine sites (UNESCO, 2003).

Indonesia is part of the “coral triangle” (Figure 1), an area including the Philippines, Solomon Islands, Timor Leste, Malaysia, Indonesia and Papua New Guinea that has the highest coral diversity on Earth. Indonesia has about 15% of the world’s coral reefs (Tomascik et al., 1997) and lies at the center of the world’s diversity of corals (Veron, 1993), molluscs (Paulay, 1997) and reef fish (Randall, 1997). Indonesia has the highest number of coral species in the world, with more than 77 genera and 537 identified species of corals (Suharsono and Purnomohadi, 2001); including 60% of the world’s hard coral species. These coral reefs form the ecological basis for one of the world’s largest marine fisheries, including spawning and nursery grounds that support one of the largest tuna fisheries on Earth.

Approximately two-thirds of the 108,920 km long Indonesian coastline, is protected by coral reefs totaling 2,0731,840 ha (MoE, 2007). All types of reefs are present in Indonesia, including fringing reefs, which are the most common, barrier reefs and patch reefs.

**Figure 1**  
**The Coral Triangle**



## D. Current Status of Tropical Forests and Biodiversity

### ***Tropical Forest Status and Management***

Indonesia's forests are among the most extensive, complex, diverse, and valuable in the world, serving as a global atmospheric filter and a carbon sink. Indonesia's forests account for about 10% of the world's remaining forests and are important to the survival of Indonesia's biodiversity: home to 25% of all fish species, 17% of birds, 16% of reptiles and amphibians, 12% of mammals and 10% of plants (Lele, 2000).

Indonesia's forest covers about half of the nation's land, 187.9 million hectares, encompassing millions of hectares of agricultural land, mining operations, upstream villages and downstream towns in addition to actual forested areas. Of the 133.6 million ha of National Forest Estate, just less than half (43.4 million ha) is allocated to production and conversion uses (see Table 3). Only 14.9% is in formal protected areas (parks, nature reserves). Another 22.5% is "protection forest." It is important to note that approximately 29.3% of the National Forest Estate is currently not covered with trees. Additionally, millions of hectares of land outside of National Forest land are forested and/or are managed as agroforestry systems.

The GOI categorizes State Forest land into four major components:

- Conservation areas or *Kawasan Konservasi* (20 million ha)
- Protection forests or *Hutan Lindung* (34 million ha) intended to prevent erosion and safeguard water resources
- Production forests or *Hutan Produksi* (58 million ha) managed primarily for timber exploitation by forest concessions, and
- Conversion Forests or *Hutan Konversi* (8 million ha) designated for release from the state domain for agricultural utilization, mostly plantation systems, in particular oil palm (GoI, Law 41 of 1999).

**Conservation Areas.** Conservation areas comprise Indonesia's protected areas system, and are sub-categorized into national parks, strict nature reserves, nature recreation parks, wildlife reserves, grand forest parks and hunting parks. All sub-categories follow international IUCN standards, and fall into IUCN categories I through IV. Indonesia's conservation area comprises both terrestrial and marine protected areas.

**Protection Forest.** Protection forests are designated to safeguard essential environmental services, particularly hydrology and erosion control. It consists of riparian areas, steep slopes, or watershed areas that preserve ecosystem functions or provide important environmental services. As the second-largest categorization of forest land, protection forests contribute significantly to the biodiversity and forest conservation landscape. By law and practice, protection forest lacks the same legal and institutional support for protection compared to conservation areas. The protection forests are not patrolled or policed for the most part, and often occur within local government boundaries and within active timber concessions.

**Production Forest.** Most commercial forestry takes place in Production Forest. Companies are provided forest concession rights, or *Hak Pengusahaan Hutan*, for a

period of thirty-five years to harvest forests under Indonesia's selective harvesting guidelines. Typical forest concessions range in size from 50,000 to 200,000 hectares. As of 2004, there were 247 forest concession holders managing a total area of 21.41 million hectares of forest. Concession holders include private companies, as well as parastatals under the control of the Ministry of Forestry.

Since Indonesia's decentralization initiative was launched in 1999, there has been a surge in the issuing of small scale forest concession permits, primarily at the district level. The legal status of such permits remains unclear, and the right to authorize forest concession permits remains a source of contention between central and local level government agencies (Bennett and Walton, 2003).

**Limited Production Forest.** This is a subset of production forest, with restrictions placed on felling.

**Conversion Forest.** As noted above, a substantial area of land has been allocated to be converted from forest to other uses, mainly agriculture, but also other activities such as transmigration and other development projects. In terms of agriculture development, forest land is typically converted to oil palm for the production of crude palm oil, or timber plantations to provide fiber to Indonesia's growing pulp and paper industry. Similar to the forest concession rights system described above, conversion forest licensing is oriented toward large-scale investments. Two key licenses associated with conversion forest are the permits for forest clear cuts for development activities, or *Izin Pemanfaatan Kayu*, and the permit for Industrial Timber Plantations, or *Hutan Tanaman Industri* (Bennett and Walton, 2003). Forest conversion frequently leads to human-wildlife conflicts, such as orangutans feeding in oil palm concessions, elephants raiding croplands, and tigers traveling on the Aceh road.

**Table 3. Forest Cover Status by Forest Classification (2005 Data).**

	National Forest Estate (x 1000 ha)							
	Permanently Designated Forest:							
Classification	Conservation	Protection	Limited Production	Production	Conversion	Area outside National Forest	Total	%
Forest:	14,365.0	22,101.7	18,180.2	20,624.3	10,693.2	7,959.9	93,924.3	50.0
Primary	10,239.0	13,390.4	6,923.2	7,887.9	5,275.2	1,057.3	44,773.0	23.8
Secondary (degraded)	4,050.6	8,406.1	10,652.6	10,969.7	5,275.4	5,791.1	45,145.5	24.0
Plantation	75.4	305.2	604.5	1,766.8	142.5	1,111.5	4,005.9	2.1
Non-Forest	4,008.7	5,622.0	5,764.8	12,639.1	11,057.2	44,163.2	83,255.0	44.3
No data (cloud cover)	1,502.3	2,327.8	1,711.1	1,995.2	981.2	2,216.0	10,733.6	5.7
Total:	19,876.0	30,051.5	25,656.2	35,258.7	22,731.5	54,339.1	187,913.0	100.0

Revised from [http://www.dephut.go.id/halaman/pranalogi\\_kehutan/Rekalkulasi05/lamp\\_Indo.pdf](http://www.dephut.go.id/halaman/pranalogi_kehutan/Rekalkulasi05/lamp_Indo.pdf)

GOI policy to boost forest production through the timber concession and plantation systems has generated significant revenues for development. Unfortunately, it has also

resulted in significant forest degradation (see areas of secondary and non-forested areas in Tables 3 and 4). Sumatra and Kalimantan have lost the greatest areas of forest cover (Table 4); these are of course among the largest islands, with the most to lose, along with Papua. As recently as 1950, some 150 million ha (84%) of Indonesia was covered in natural forest, mostly primary forest (GFW/FWI, 2002). At present – although some 70% of the country’s land area is legally classified as “forest land” – forest cover has declined precipitously. As of 2005, approximately 90 million ha remained in primary or secondary forest. Since 1995, more than 20 million hectares of forest have been cleared, resulting in one of the highest rates of tropical forest loss in the world. Since the mid-1990s, rates of forest degradation have been highly variable, with large peaks in deforestation rates due to large scale fires and rampant illegal harvesting associated with localized lack of enforcement and corruption. While data remain unreliable, estimates for forest degradation from such institutions as the World Bank and the Ministry of Forestry ranged from 1.8 to 3.6 million hectares per year during the 90’s and early 21<sup>st</sup> century. This rate appears to have slowed in the past few years, more recent estimates from WRI using satellite data for the time period 2001 – 2006 was a total of 3.64 million ha deforested, with an average of 728 thousand ha lost per year (range 218 thousand ha to 1.18 million ha per year).

**Table 4. Forest Cover Status by Island and Forest Classification (2005 Data).**

Extent of Forest Cover Inside and Outside of Officially Designated Forest Area Based on the Interpretation of Landsat 7 ETM+ Satellite Image (x 1000 ha)							
Island/ Presence or absence of Forest Cover	National Forest Estate Area					Area outside National Forest Estate	Total
	Designated Permanent Forest Status				Conversion		
	Conservation	Protection	Limited Production	Production			
SUMATERA							
Forest	3,226.25	3,735.45	2,397.31	3,015.15	1,142.61	1,133.22	14,649.99
Non Forest	957.73	2,178.31	2,459.10	3,576.04	4,413.59	16,744.68	30,329.46
No Data	348.54	432.55	237.88	348.45	180.06	605.45	2,152.92
Total	4,532.52	6,346.31	5,094.30	6,939.63	5,736.27	18,483.35	47,132.37
JAVA							
Forest	354.74	531.55	185.53	1,098.56	-	921.26	921.26
Non Forest	79.38	199.24	183.27	438.26	-	9,297.13	9,297.13
No Data	20.23	19.98	3.04	22.05	-	56.74	56.74
Total	454.34	750.77	371.84	1,558.87	-	10,275.14	10,275.14
BALI							
Forest	17.07	48.6	2.24	0.09	-	8.69	76.7
Non Forest	4.98	31.03	3.85	1.82	-	366.55	408.22
No Data	1.83	19.68	0.11	0.16	-	60.23	82.01
Total	23.88	99.31	6.19	2.07	-	435.47	566.92
NUSA TENGGARA							
Forest	180.2	619.43	277.56	252.9	14.91	1,279.38	2,625.00
Non Forest	202.82	402.56	169.04	188.42	99.37	2,604.14	3,666.37
No Data	64.37	153.73	64.91	40.1	-	143.23	466.34
Total	447.39	1,175.72	511.51	481.42	114.28	4,026.75	6,757.71

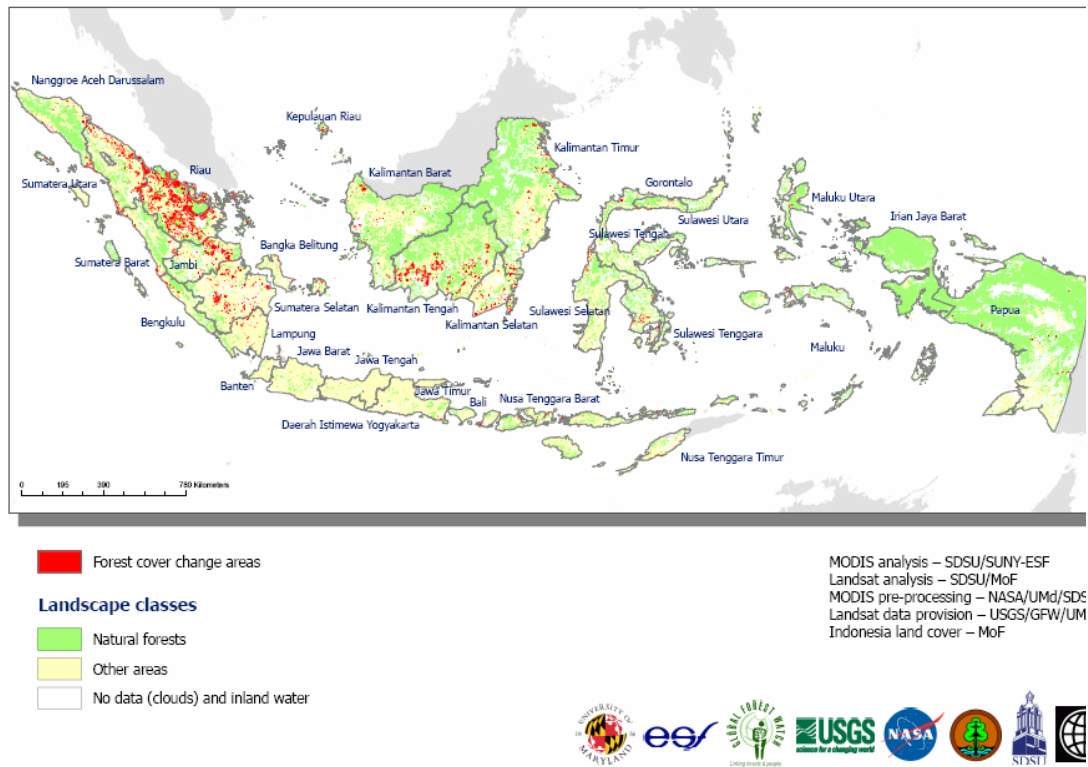


Extent of Forest Cover Inside and Outside of Officially Designated Forest Area Based on the Interpretation of Landsat 7 ETM+ Satellite Image (x 1000 ha) (continued)							
Island/ Presence or absence of Forest Cover	National Forest Estate Area					Area outside National Forest Estate	Total
	Designated Permanent Forest Status				Conversion		
	Conservation	Protection	Limited Production	Production			
KALIMANTAN							
Forest	3,033.02	5,338.15	8,588.43	6,817.75	1,667.68	2,787.89	28,232.91
Non Forest	1,069.40	730.91	1,909.30	6,246.77	3,349.47	9,064.73	22,370.57
No Data	258.86	348.31	591.43	667.06	1.59	569.41	2,436.66
Total	4,361.27	6,417.37	11,089.16	13,731.59	5,018.73	12,422.03	53,040.14
SULAWESI							
Forest	1,095.00	3,297.38	2,450.35	707.27	295.04	1,027.85	8,872.88
Non Forest	169.15	859.12	579.32	393.32	218.42	5,220.66	7,439.98
No Data	214.52	605.73	282.3	298.52	72.47	667.94	2,141.48
Total	1,478.67	4,762.23	3,311.97	1,399.11	585.92	6,916.45	18,454.35
MALUKU							
Forest	278.42	932.23	1,073.24	647.34	910.35	175.96	4,017.54
Non Forest	76.65	200.3	275.52	346.77	1,106.81	442.5	2,448.55
No Data	95.6	222.29	244.46	204.84	479.11	78.66	1,324.96
Total	450.66	1,354.83	1,593.23	1,198.95	2,496.26	697.12	7,791.05
PAPUA							
Forest	6,179.71	7,598.92	3,205.54	8,085.29	6,662.57	625.65	32,357.67
Non Forest	1,448.59	1,020.58	185.41	1,447.70	1,869.56	422.77	6,394.61
No Data	498.39	525.5	286.94	414.03	247.99	34.38	2,007.23
Total	8,126.69	9,145.01	3,677.88	9,947.02	8,780.12	1,082.80	40,759.52
INDONESIA							
Forest	14,365.04	22,101.71	18,180.19	20,624.33	10,693.16	7,959.90	93,924.33
Non Forest	4,008.69	5,622.04	5,764.80	12,639.11	11,057.22	44,163.17	83,255.03
No Data	1,502.32	2,327.79	1,711.08	1,995.21	981.21	2,216.04	10,733.64
TOTAL INDONESIA	19,876.06	30,051.54	25,656.06	35,258.66	22,731.58	54,339.10	187,913.00

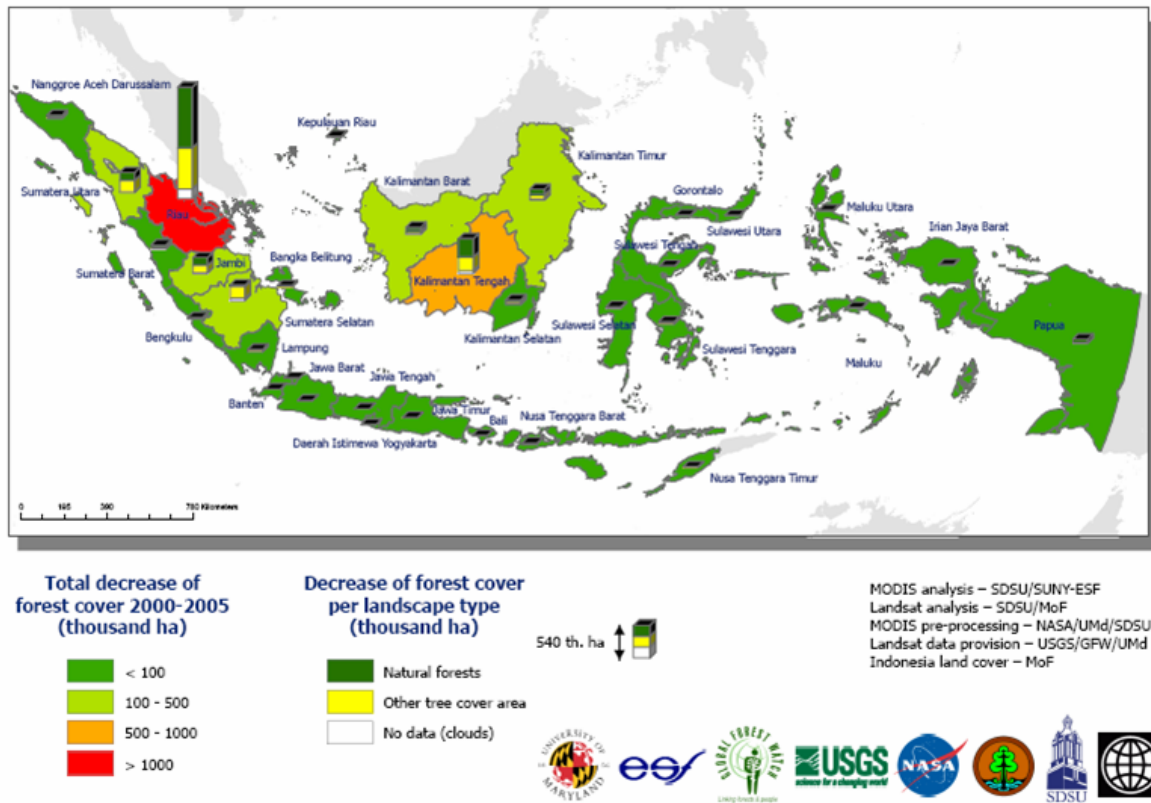
Revised from [http://www.dephut.go.id/Halaman/Buku-buku/2006/Statistik\\_06/Statistik\\_06.htm](http://www.dephut.go.id/Halaman/Buku-buku/2006/Statistik_06/Statistik_06.htm)

The Ministry of Forestry estimates that for 2000 -2005, a total of 5.45 million ha was deforested with an average of 1.09 million ha lost per year (range 635 thousand ha to 1.91 million ha per year) (see Figure 2). Rates of forest degradation due to poor management and illegal logging appear to be declining due, in part, to both better enforcement and improved forest management. Over 1 million ha of the forest estate are currently FSC certified as being under sustainable management. It may also be that extraction rates are declining as both the amount of commercial timber available and the difficulty of extraction rises (assuming that easy access were sites harvested first).

**Figure 2 Indonesia's Forest Cover**



**Figure 3. Indonesia's Decrease in Forest Cover from 2000 - 2005.**



## ***Biodiversity Status and Management***

### **Protected Areas**

Indonesia has allocated over 10% its land area as Protected Areas, including a network of 495 terrestrial protected areas covering 22.7 million hectares and 40 marine PAs covering 11.6 million ha under the Ministry of Forestry (see Table 5), plus another 69 conservation areas totaling 3.4 million ha, under the Ministry of Marine and Fisheries (see Table 6). Established mostly during the 1980s, Indonesia's protected area system is founded on a habitat and biodiversity representation approach. Indonesia continues to invest in their protected areas, increasing both the number of areas as well as expenditures [from USD\$ 0.44 per ha in 1996 to USD\$2.35 per ha in 2004 (MoE, 2007)].

The 95-year old Indonesian protected areas initiative can claim many successes. These include:

- A science-based PA design that represents much of the macro-scale bio-geographic diversity of Indonesia in a system of designated protected areas.
- A huge area of land and sea designated as PA, at least in the policy and planning documents of the international community and national government.
- An extensive network of senior professionals and government officials with training in protected area management and conservation.
- A policy discourse that has aligned PAs with macro-economic policy and social justice agendas.

**Table 5. Structure and Extent of Indonesia's Protected Areas System under the Ministry of Forestry as of 2007.**

<b>Classification</b>	<b>2007 Number of Units</b>	<b>2007 Area (ha)</b>
Natural Reserve	247	4,707,609.65
-Terrestrial	240	4,338,499.65
-Marine	7	369,110.00
Wildlife Sanctuary	77	5,389,855.64
-Terrestrial	70	5,051,737.39
-Marine	7	338,118.25
National Park	51	22,280,792.64
-Terrestrial	43	12,237,251.34
-Marine	7	4,045,049.00
Natural Recreation Park	123	1,039,336.56
-Terrestrial	105	256,903.35
-Marine	18	770,120.00
Grand Forest Park	21	343,454.41
Hunting Park	14	226,200.69
<b>Total</b>	<b>531</b>	<b>27,987,249.59</b>

*Source:* Revised from MoE, 2008

**Table 6. Structure and Extent of Indonesia's Protected Areas System under the Ministry of Marine and Fisheries as of 2007.**

<b>Classification</b>	<b>Number of Units</b>	<b>Area (ha)</b>
Regional Marine Conservation Area	28	3,281,922.66
Proposed Regional Marine Conservation Area	23	13,611,823.48
Marine Protected Area / Mangrove Protected Area	27	2,085.90
Fish Sanctuary	10	453.23
<b>Total</b>	<b>69</b>	<b>16,896,285.27</b>

Source: MoE, 2008

Multiple challenges, however, are still faced in financing and implementing sustainable management practices to conserve Indonesia's threatened biodiversity. These include:

- The current PA system does not include some of the important biodiversity areas,
- Some PAs are not sufficiently large to protect viable populations of threatened and endemic species long term, and spatial plans do not incorporate connecting corridors allowing for migration.
- Climate change is beginning to affect the range and distribution of species, and the current PA system does not address this fully.
- High turnover and low numbers of skilled professionals leaves important PAs without sufficient numbers.
- Insufficient funds are budgeted for PA management, and sustainable long term financing mechanisms are not in place.

### **Freshwater Sector**

The majority of freshwater areas are polluted from sewage inputs, household waste, agricultural runoff, and siltation. At least 62 rivers have been classified as being in critical condition (MoE, 2006), based on the low amount of land cover, high annual erosion rate, high ratio between maximum and minimum water debit, and excessive sediment load. Several lakes are facing a similar plight, with high rates of sedimentation, waste accretion from surrounding land use, and pollution from fertilizer runoff. Industrial pollution is common in urban areas. In several areas (e.g., Sulawesi, Kalimantan) there is heavy metal poisoning (mercury) from unregulated community gold mining. Invasive species, such as tilapia, elephant grass, and water hyacinth, are replacing native species communities and drying up streams. There is high seasonal variability in available water supplies, with extended or unpredictable dry seasons increasingly impacting the poor through crop failures, longer distances that must be covered to reach water supplies, and higher prices of purchased water from vendors. Extraction exceeding recharge rate is leading to aquifer depletion with subsequent saltwater intrusion, and both land use changes and climate change are leading to freshwater system degradation.

Inland fisheries production reached 310,350 tons in 2004, with shrimp production accounting for 1.8% of the total, and the remainder fish species such as tilapia, catfish, kissing gouramis, and snakehead murrel (93.6%) (FAO, 2008). Aquaculture production reached 1,045,051 tons in 2004, occupying 714 045 ha. Brackish-water aquaculture was

68.60% of the area, followed by paddy field (17.43%), and pond aquaculture (13.97%). Brackish-water aquaculture is practiced most commonly in Java (33.34%), Sumatra (21.49%), and Sulawesi (28.87%) (FAO, 2008).

### **Marine Sector**

Indonesia's coral reefs have suffered extensive degradation over the past 30-40 years from coral bleaching, bombing, poisoning, sedimentation, anchor damage, and harvesting. A survey conducted in 2000 concluded that less than 30% of coral reefs remained in good condition (World Bank, 2004), while a 2002 study warned that 86% were under either high or medium levels of threat, with fully 46% highly threatened.

Cesar et al., (1997) modeled the economic effects of reef degradation in Indonesia and estimated that the loss to the fishery sector from reef degradation and over fishing to be \$410,000 per km<sup>2</sup>. Extrapolations from studies suggest that Indonesia has already lost 40% of its reef fisheries resource, yielding an estimated economic loss of \$30 billion over 25 years. Total marine fish capture in 2004 was 4, 501, 070 tons, with tunas representing 16.6% of the catch, shrimp 5.5%, other fishes 70.3%, and other aquatic organisms 7.6% (FAO, 2008). Mariculture activities focus primarily on seaweed (94.55%), with limited production of colored rosar shell, groupers and sea bass (FAO, 2008).

### **Species Information**

The Indonesian endangered animal and plant lists (see Table 7) have been compiled (Noerdjito and Maryanto 2001). Species in that publication are officially recognized as endangered based on a Ministerial decision or *Surat Keputusan Menteri*. A more recent publication for plants by Wiriadinata et al. (2001) has further information and also includes some proposed additions to the list of endangered plants. Officially recognized endangered species lists for the GOI are not correlated with the globally used IUCN Red List (IUCN, 2008). IUCN endangered species lists are regularly updated and are available online at <http://www.iucnredlist.org>; the number of species at risk is increasing. Several species in Indonesia are considered critically endangered (have an extremely high probability of going extinct) by the IUCN. These include the Bali starling (*Leucopsar rothschildi*), the Yellow-crested Cockatoo (*Cacatua sulphurea*), Javanese Rhinoceros (*Rhinoceros sondaicus*), the Sumatran Rhinoceros (*Dicerorhinus sumatrensis*), the Sumatran tiger (*Phantera tigris sumatrae*), and the Sumatran orangutan (*Pongo abelli*). A list of priority species (GOI, 2008) for the Indonesian Government can be found in Appendix II.

Eleven endangered charismatic species receives extra protection from a Presidential Decree within the listing of endangered animals and plants in *Peraturan Pemerintah Republik Indonesia* No.7 and 8 (1999) ([www.dephut.go.id](http://www.dephut.go.id)). They are as follows:

- Anoa (*Anoa depressicornis*, *Anoa quarlesi*)
- Babirusa (*Babyrousa babyrussa*)
- Javanese Rhinoceros (*Rhinoceros sondaicus*)
- Sumatran Rhinoceros (*Dicerorhinus sumatrensis*)
- Komodo Dragon (*Varanus komodoensis*)
- Bird of Paradise (all species in the family *Paradiseidae*)
- Javanese Eagle (*Spizaetus bartelsi*)

- Sumatran Tiger (*Phantera tigris sumatrae*)
- Leaf Monkey (*Presbytis potenziani*)
- Orangutan (*Pongo pygmaeus*)
- Javanese Gibbon (*Hylobates moloch*)

It should be noted that the orangutan species *Pongo pygmaeus* has since been split into two full species recognized by the IUCN. These two separate species are the Bornean orangutan (*Pongo pygmaeus*) and the Sumatran orangutan (*Pongo abelli*). The Sumatran orangutan population is much smaller than the Bornean orangutan population, and at much greater risk. Currently, the two species appear to be receiving equal protection, but there is a legal loophole (*Pongo abelli* is not listed by the GOI) that could result in reduced protection for the Sumatran orangutan protection that should be resolved if possible.

**Table 7. Total number of species at risk of extinction.**

Taxonomic Group	Total Number Species at Risk Based on:				Total Number of Species In Indonesia
	Official List (Noerdjito & Maryanto, 2001)	GOI Biodiversity Action Plan 1993	IUCN Redlist 2001	IUCN Redlist 2008	
Mammals	<b>131</b>	27	128	183	457
Birds	<b>390</b>	9 (126)*	104	115	1530
Reptiles	<b>48</b>	12	19	27	514
Amphibians				33	-
Fish	<b>8</b>	3	60	111	1400
Insects	<b>19</b>	4	-		250,000?
Mollusks	<b>12</b>	2	-	3	20,000?
Other invertebrates				229	
Crustaceans	<b>9</b>	0	-		
Plants	<b>110</b>	0	184	386	29,375

*More complete list of Collar & Andrew (1988). IBSAP 2003*

As previously stated, Indonesia has extremely high levels of biodiversity and endemism (found only in one island or location) (see Table 8). New species continue to be discovered on an annual basis, and data are lacking or incomplete for many parts of Indonesia.

**Table 8. Total Number of Species and Endemism by Major Taxonomic Group.**

Island	Birds		Mammals		Reptiles	
	# species	% endemic	# species	% endemic	# species	% endemic
Sumatra	465	2	194	19	217	11
Java/Bali	362	7	133	12	173	6
Kalimantan	420	6	<b>201</b>	18	<b>254</b>	24
Sulawesi	289	32	114	<b>60</b>	117	26

Island	Birds		Mammals		Reptiles	
	# species	% endemic	# species	% endemic	# species	% endemic
Nusa Tenggara	242	30	41	12	77	22
Maluku	210	33	69	17	98	18
Papua	<b>602</b>	<b>52</b>	125	58	223	<b>35</b>

Revised from IBSAP 2003

A provisional analysis of biological importance based on biodiversity (number of species, percentage endemism) and forest cover indicates that highest priority islands (in order) are: Papua, Kalimantan, Sumatra, and Sulawesi (see Table 9). Forest cover is given double weighting, to account for the fact that lack of information and accurate counts are generally positively correlated with the forest size. It should be noted Indonesia's forest land contains 22.5 million ha of peat forest and vast quantities of carbon, primarily located in Sumatra, Kalimantan, and Papua. This constitutes 12% of Indonesia's land area and 83% of all peat lands in Southeast Asia.

**Table 9. Ranking based on biodiversity and forest cover (7 highest, 1 lowest).**

Island	# sp Birds	% endemic birds	# sp mammals	% endemic mammals	# sp reptiles	% endemic reptiles	# plants	% intact forest cover (weighted double)	Total	Overall Rank
Sumatra	6	1	6	5	5	2	5	6	40	5
Java/Bali	4	3	5	1.5	4	1	3	1	25.5	3
Kalimantan	5	2	7	4	7	5	6	7	48	6
Sulawesi	3	5	3	7	3	6	4	4	39	4
Nusa Tenggara	2	4	1	1.5	1	4	1.5	2	17	1
Maluku	1	6	2	3	2	3	1.5	3	24.5	2
Papua	7	7	4	6	6	7	7	5	58	7

## E. Assessment of Threats to Tropical Forests and Biodiversity

Indonesia faces a wide array of threats to its tropical forests and biodiversity. Large-scale forest fires, hunting, pollution, land conversion, invasive species, and climate change are some of the direct threats. Underlying (or indirect) causes of environmental degradation are also numerous and include weak institutions, poor policies, economic demand, poor governance, population growth, lack of information, culture, and other factors identified in the threats table. Examples of how important underlying root causes operate:

- Perverse policy incentives which fail to account for the full costs of resource exploitation, and favor short-term financial returns over long-term productivity and sustainability, lead to over-harvesting and forest conversion, with subsequent ecosystem degradation and habitat loss.
- Indeterminate and conflicting land and resource ownership, access and control (i.e. "tenure") create an "open access" situation in vast forest and near shore marine areas, and lead to rapid resource depletion and consequent ecosystem degradation and habitat loss.

- Market demand for forest products (including timber and wildlife), agricultural commodities (especially oil palm), and high-value marine products, lead to over-harvesting, forest conversion, and species loss.
- The decentralization process over the past decade has created conflicts of authority between various levels of government, often poor local governance capacity, and, in some cases, facilitated rapid resource depletion by newly empowered local administrations.

A Threats Analysis and ranking was developed based on information obtained from interviews with government officials, donors, private sector, NGOs, community stakeholders, and a participatory stakeholder workshop, plus available statistics. The Threat Analysis (see Appendix V) quantifies the scale/magnitude of identified threat, identifies whether a threat is direct or indirect, the threat timeframe, and the feasibility of interventions. The threats are ranked based on severity and scale of threat and probable outcome of feasible intervention. The top ranked major threats (both direct and indirect or underlying root causes) include:

**Climate Change (Direct and Indirect).** Indonesia is at severe risk of large scale loss of biodiversity and tropical forest cover. Climate change impacts are on a much larger scale than other threats, and include both marine and terrestrial biodiversity. The timeframe until impact varies between species and habitats depending upon tolerance to changes and the rate of climate change impacts. Increasing temperatures and changing rainfall patterns are currently leading to a reduction in suitable habitat for many species. Some habitats are being eliminated completely (inundated by rising sea levels or dying off as temperatures exceed tolerance levels [e.g. coral reefs]). Species' ranges are shifting (e.g. some lowland bird species are now nesting in higher altitudes), but this is not always an option as there may be no suitable habitat remaining. Adaptation rates differ between the faunal and floral communities; the rate at which plant communities can disperse into new areas lags significantly behind the faunal community. Reproductive cycles are shifting based on environmental cues, and this affects offspring survival rates if insufficient food resources are available. Forests stressed by high temperatures and altered rainfall parameters are more vulnerable to disease and pests. Increased tree mortality leads to greater amounts of standing dead wood, and further risk from large scale fires. Large scale fires, particularly in peat forest, release enormous amounts of GHGs.

This has significant implications for Indonesia's food security and economic growth. Agricultural productivity is likely to be reduced due to the loss of pollinators, seed dispersers, and insectivores, plus the loss of coastal rice paddies inundated to rising sea levels. Fisheries production is already affected by coral reef bleaching and ocean acidification. Loss of productivity negatively impacts food security and leads to potential conflicts and increased economic hardship for impoverished communities.

Indonesia has been identified as the world's third-largest emitter of GHGs contributing to climate change due its high deforestation rate, particularly in carbon-rich peat forests (World Bank et al., 2007). Approximately 80% of Indonesia's emissions are from the forestry sector. Indonesia can, and should, play a significant role in reducing emissions,



but reducing risks from climate change requires a coordinated multinational approach. Emissions from the energy sector (including transportation, household and industrial electricity generation, etc.), although relatively low at present, are a growing source of GHG emissions. Energy subsidies and perverse policies undermine efforts for energy efficiency and inclusion of alternative energy sources that could potentially reduce GHG emissions.

**Land Conversion (Direct).** This is a direct major threat to the fauna and flora of Indonesia, completely eliminating habitats. The swiftness of land conversion, and the severity and (frequent) irreversibility of the impacts, makes this threat of the highest order and urgency to address for terrestrial habitats. Without addressing forest conversion, a number of other threats become moot (wildlife extinction, hunting, illegal logging, roads, mining, policies).

Conversion for agriculture or plantations increases fire risk, and conversion of peat forest specifically releases gigatons of GHG on an annual basis contributing significantly to climate change. The removal of natural forest cover is leading to forest fragmentation, the loss of biological corridors, and the creation of biological islands at higher risk of extinction. Lowland forests are at greater risk than montane forest, due to easier access, and much of Indonesia's lowland forest has already been converted.

Individuals are encroaching into national parks and protection forest to plant cash crops (coffee and cocoa) and subsistence crops (rice, vegetables). Although clearly an underestimate as no data were available for multiple provinces, the Ministry of Forestry reported that in 2006, 34,005 ha of forest were degraded due to illegal settlements and 10,663 ha of forest were lost to shifting cultivation. Reclassification of forest land (from forest to non-forest) for oil palm is becoming increasingly common. As of 2006, approximately 6.6 million ha were planted in oil palm, primarily located in Kalimantan and Sumatra, with large areas planned for Papua. The rate of encroachment continues to rise as the economic crisis continues, and the immediate economic return on oil palm as a biofuel is greater relative to other land uses. It should be noted, however, that palm oil has taken a nose dive, dropping almost in half from highs of \$1,249 to \$771 during 2008 (FAO, 2008). Dropping gas prices appear to be reducing demand for biofuels, but this is likely to be temporary.

Loss of forest cover, particularly mangrove, increases erosion and sedimentation, harming adjacent coral reefs, and eliminates fish breeding habitats, resulting in reduced fisheries diversity and production. Coastal mangroves are being converted for shrimp ponds (tambak) throughout Indonesia. These shrimp ponds are non-sustainable, and generally must be abandoned within 3 to 7 years due to disease build-up.

**Fire (Direct).** Indonesia has suffered from large scale fires on a regularly occurring basis since the 1980's. This appears due to a combination of factors, including climate change, increased deforestation and forest degradation, the use of fires for land clearing, and for arson. Natural forests in good condition are more resistant to fire invasion. Closed canopies reduce ground cover and increase humidity levels, thus reducing the amount of

fuel available, and the severity of the fire. However, unlike temperate forests, tropical forest tree species are generally not fire adapted. Seed banks may be destroyed, particularly if there are multiple fire events, thus inhibiting natural regeneration. Peat forests are most seriously affected by fire: areas burned more than twice lose almost all tree cover (Yeager, et al. 2003). Severe fires may permanently shift the climax vegetation from forest to alang alang (*Imperata sp.*) grassland, a fire adapted species that quickly recovers from fire damage and outcompetes regenerating native species (Goldammer, 1999). Grasslands become tinder in the dry season, easily catching fire and allowing fires to spread farther and faster than under natural vegetation mix.

Fire damage varies widely from year to year; from 2002 – 2006 fires damaged 52,130 ha of forest based on Landsat data. During the large scale fires of 1997-1998 in East Kalimantan, approximately 3.6 million ha of forest were fire damaged (GTZ, 2000), with almost 2.3 million ha located in natural forest concession areas, 0.4 million ha in protected forests, and 0.9 million ha in forest plantation enterprises. Peat swamp fires and coal seam fires are particularly problematic, as they emit gigatons of carbon into the atmosphere, and fires travel underground, leaving standing dead wood that serves as fuel in future fires.

**Destructive Fishing Practices (Direct).** Bombing of coral reefs, poisoning, electroshocking, and bombing of fish communities, particularly in river systems and lakes, are threatening endemic species, resulting in loss of biodiversity. Divers frequently spray cyanide on reefs and their associated fish communities to stun ornamental fish for the aquarium trade and threatened groupers for the live fish trade, damaging the reefs and often killing the fish in transit. Electroshocking can kill off entire populations in small water bodies. Large nets often result in by-catch of endangered species, such as marine turtles.

**Population Growth (Indirect).** Increased population size leads to greater demands on the natural resource base in order to meet basic human needs, as well as potential over-harvesting of resources, pollution, introduced species (particularly domesticated species), and increased land conversion. Indonesia's family planning program has led to a dramatic decrease in average family size throughout much of Indonesia. Much of Indonesia's population is located on the island of Java. Population growth in outer islands is due in part to reduced access to reproductive health care, but high infant mortality rates can lead to larger family sizes. Migration has often been a significant contributor. An officially supported transmigration program (since cancelled) provided incentives to Javanese to move to sparsely populated outer islands. More recently, there has been a steady in-flux of economic migrants to areas with high levels of valuable natural resources, such as gold. This in-migration has caused conflict with local residents in some areas over access and control of natural resources, and migrants are moving into some protected areas as the path of least resistance. The lack of distinct boundaries and unclear land tenure, combined with easy access to park resources, has proved an attraction to migrants (particularly in the lowland areas). For example, in the early 1990's thousands of migrants moved into the buffer zone and into Tanjung Puting National Park when gold was discovered. Refugees from conflicts in Poso District in May 2000

resulted in the temporary displacement of tens of thousands of people into Palu. Population shifts due to in-migration are outside the manageable interest of the Mission.

**Lack of Appropriate Land Use/Spatial Planning (Indirect).** This has led to increased pollution and inappropriate forest conversion, loss of ecosystem services and biodiversity, and increased conflict over access to resources. The ability to address issues dealing with land use and natural resource governance is hampered by the absence of detailed integrated land use plans at the district and provincial level, and clear regulations and policy regarding development of integrated spatial plans. Local governments view non-sustainable resource extraction as normal business practice, and necessary for rapid economic development. There is little, if any, coordination between the numerous Ministries and their local equivalents that need to play a role (see Table 1). Ecological considerations, including the maintenance of essential ecosystem functions and biological corridors, have not been included in land use plans in the past. Where plans are available, there is little support for implementation as stakeholder input has not been obtained, and there are political and economic pressures on local government. Longer term sustainability needs to be linked to business prosperity to obtain support; if these linkages are not made there is a high probability of losing the natural resource base.

**Logging – Large Scale (Direct).** Over-harvesting and poor management practices degrade extensive forest areas, making them more vulnerable to fire and an easy target for conversion. A small but growing number of timber concessions are certified (approximately 1 million ha) or in the process of getting certified, with a significant increase in demand for certification in the last few years. Much of the commercial timber industry focuses on valuable hardwood species from the Dipterocarp family, and uses selective logging. The majority of concessions are found in Kalimantan, Sumatra, and Papua, with teak plantations established in Java. The commercial market for timber is smaller in Central Sulawesi, as commercially valuable species, such as Dipterocarps, are less abundant.

Timber is often harvested illegally for commercial purposes, particularly for the pulp and paper industry. There is significant overcapacity in the timber sector helping to drive the demand. Total industrial demand is approximately 60 million m<sup>3</sup> per year (World Bank, 2006), with pulp and paper making up approximately half of that as of 2005 (MoF, 2007). Sustainable yields from timber plantations and production forest, however, are only estimated at between 11- 13 million m<sup>3</sup> per year (World Bank, 2006). To fill this gap, timber is either: a) extracted illegally (see below), b) over-harvested from legal sources, or c) obtained through clear-cutting from land conversion (regazettement – also often legally questionable). According to Casson et al. (2007) there are three major types of illegal logging in Indonesia:

1. Nominally legal logging corporations with valid licenses that violate silvicultural regulations and extract timber beyond their concession borders.
2. Cooperatives or medium size logging companies that fell and trade timber with 1 year small-scale harvesting permits issued by district government officials (declared illegal in 2002).

3. Selective felling of commercially valuable species in all forest categories by local people organized and financed by *cukong* (middlemen). This is known as “wild logging”.

**Hunting (Direct).** Illegal hunting can lead to local extinctions (or total extinction for endemic species), resulting in lower biodiversity, and a potential cascade of related extinctions if the species is a “keystone” species (a species that helps regulate the community diversity and population sizes). Protected species continue to be hunted on a regular basis throughout Indonesia. Species groups most affected include birds, turtles, primates, and ungulates. Macaques are a holiday staple among some of the local communities and considered a delicacy by the Wana people of Sulawesi. Turtle and bird eggs are eaten regularly by local populations, or collected for sale to Java. There is also a growing bush meat market in several parts of Indonesia, with meat provided to isolated logging and mining camps. In addition to hunting for food, sports hunting does occur in some areas. Although ownership of guns and bullets is restricted to the police and military, indigenous communities (i.e., Penan, Kenyah) in East Kalimantan are able to purchase guns and ammunition across the border in Malaysia. Communities that were barter-based in the early 1990’s now have increased monetary funds available due to increased economic activities, and young men now have sufficient funds to purchase bullets and go out for target practice. Protected species, such as sun bears, pangolins, and hornbills are also hunted for their feathers, claws, or skins for use as ornamentation or in religious ceremonies, as well as for the pet trade (see below). Protected species that are perceived as pests (e.g., orangutans in a plantation forest), are also hunted.

**Over-harvesting (Direct).** Over-harvesting puts populations at risk of extinction, as extraction rates may exceed natural reproduction rates. The fisheries sector is at high risk; grouper fish, tuna, and other species are threatened. Marine turtle populations have been hard hit by egg collection. During the turtle reproductive season, people will collect almost all the eggs that are laid. Aquarium (ornamental) fish, including “cleaner fish” which play an important role in reef ecology, are being collected for export and the local pet trade. There is significant illegal demand for exotic pets, including parrot species, birds of paradise, the Bali Starlings, orangutans, gibbons, and other primates, as well as sunbears, and tigers. Apart from timber, rattans, gaharu, honey, sap, fruit, and fuel wood are among the most common forest products harvested for commercial purposes. Harvesting pressures have led to a noticeable drop in abundance and diversity of gaharu and rattan species in some areas. In general, the lack of clear enforced ownership has led to uncontrolled use of natural resources (i.e., tragedy of the commons).

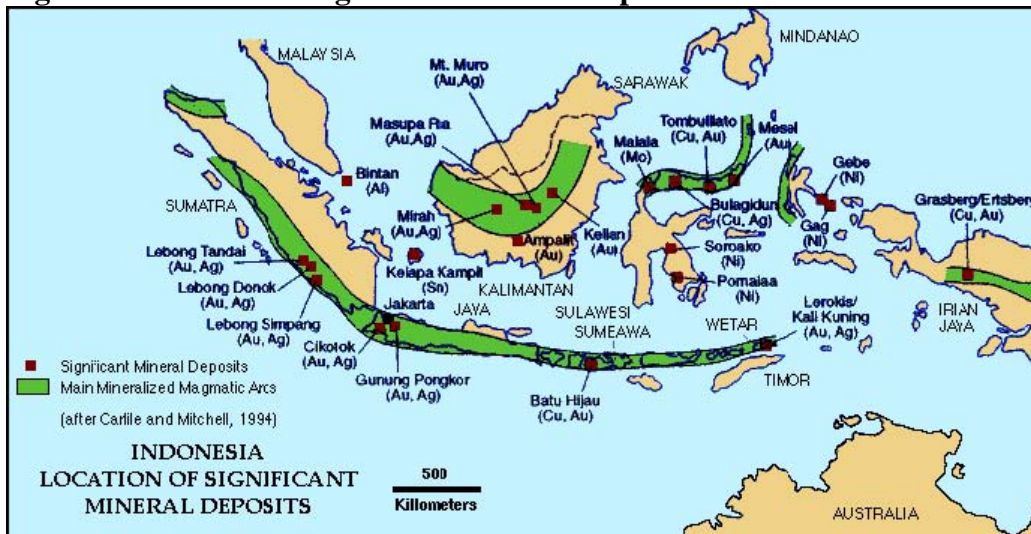
**Roads (Direct and Indirect).** Numerous studies by the World Bank and others have shown that roads have a negative impact on biodiversity conservation. Road construction and improvement often requires forest conversion and increases ease of access, illegal forest conversion, poaching, and over-harvesting of non-timber forest products. Several National Parks and protection forest have been severely degraded following road development and / or improvement, including Kutai, Kerinci Seblat, and Lore Lindu. A district-funded road bisecting Leuser National Park may have a devastating impact on the connectivity of that important ecosystem. In Kalimantan, the North Trans Kalimantan

Highway proposed by the GOI poses huge threats to the “Heart of Borneo”. The central section that bisects two national parks is unlikely to be built, however, due to intense NGO pressure and the high costs of building in the rough terrain.

**Mining – small scale (Direct).** Unregulated small-scale mining has had significant impacts on biodiversity and forest cover in several parts of Indonesia. For example, in Sulawesi, approximately 20,000 individual miners use mercury (a heavy metal with enormous health impacts) to process gold. The mercury is burned off inside homes, putting children at risk. Tailings are disposed of in small creeks and rivers, contaminating freshwater sources and the bay. In Kalimantan, following the discovery of alluvial gold in and around the buffer zone of Tanjung Puting National Park, a similar scene played out, with thousands of migrants descending upon the park and contaminating the Sekonyer River. Large blocks of heath forest were converted, and permanently changed to large swathes of denuded sandy expanses. Due to unregulated use of toxins and forest conversion, the area of contamination is quite large, and large swathes of forest may be converted. Zircon is now also being mined, and there have multiple fish die-offs over the past two decades due to chemical contamination and sedimentation.

**Mining – commercial (Direct).** Commercial mining has converted large expanses of forests (e.g., the Freeport mine in Papua), permanently changing the landscape. Mineral deposits are located throughout much of Indonesia (Figure 4). Commercial mining produces large amounts of tailings, and if improperly handled, leachate from tailings can contaminate aquifers and rivers. Commercial mining, while having significant environmental impacts, can often be better controlled and contained than unregulated mining.

**Figure 4. Location of Significant Mineral Deposits in Indonesia**



Source: MoE, 2008 State of the Environment

**Introduced Species (Direct).** Introduced species may outcompete native species, causing local extinctions, or alter ecosystem processes, resulting in loss of biodiversity. There are numerous invasive species in Indonesia (see Appendix III). Commercial fish species,

such as tilapia, have been introduced by local residents as a food source in some lakes and rivers and have all but eliminated native species. In Papua, *Piper aduncum*, an invasive shrub, is outcompeting native tree species, due to its fast growth rate and high seed production, resulting in monoculture stands.

**Heavy Industry (Direct).** Pollution impacts from industry, including GHG emissions, and toxic chemicals, affect most of Indonesia. Large scale die-offs due to contamination of freshwater have occurred in several river systems. This sector is not large at present, but is poorly regulated, and often contaminates very large areas.

**Freshwater and aquifer depletion/contamination (Direct).** Freshwater habitats are disappearing, or becoming severely contaminated leading to a loss in biodiversity. Rivers and streams are drying up due to deforestation, climate change, and diversion of water flow for agriculture, industry, and household use. Growing population sizes are increasing demand on aquifers, with extraction rates exceeding replenishment through rainfall, resulting in subsidence, saltwater intrusion, and desertification in some areas. Human water needs as of 2004 were approximately 435.7 thousand cubic meters for drinking water and 170.4 billion cubic meters for food crops (MoE, 2007), and these are increasing with population growth. Pollution, from both point (e.g. industry) and non-point (e.g. acid rain, agricultural run-off) sources are contaminating water bodies. Waste water management is generally lacking, with latrines often emptying directly into rivers, lakes, or the ocean.

**Infrastructure Development (Direct).** As the population and economy grows, infrastructure development requires greater land conversion, and increases pollution impacts. Infrastructure development pressures are highest in provinces and districts with rich natural resources, such as Papua, Aceh, and parts of Kalimantan. Lack of land use planning or official spatial plans, or the implementation of approved plans, results in poor development choices.

**Economic (Indirect).** Economic forces affect biodiversity and forest cover through two major avenues: market demand, and the lack of viable economic alternatives. Increased market demand leads to over-harvesting of natural resources and conversion of forest to produce more crops (e.g. oil palm). The current financial crisis is reducing market demand for many crops and commodities, including palm oil and rubber, but this is likely to be temporary. Community members in the outer islands have few alternative economic opportunities apart from agriculture, fisheries, logging, and non-timber forest product extraction, as the districts lack large-scale industry, and the populace generally has low educational levels. Corporations working large-scale rich mineral and oil deposits often want trained technical staff, and import workers from Java or elsewhere, and most provinces have insufficient infrastructure (electrical power, roads) to support economic growth. Food prices have risen sharply over the past year, and although falling, it is still placing a major hardship on the impoverished. High food prices and lack of economic alternatives leads to over-harvesting, illegal hunting, and land conversion for agriculture, as well as reduced protein intake and malnutrition. Economic models of illegal logging indicate that value added in forest industries would decrease significantly in Indonesia (12%) if this were to be reduced, while increasing value added in the US (2%) (Li, et al.,

2008). Thus there is an economic disincentive to reducing illegal logging, as Indonesia would bear the brunt of the costs.

**Conflict over natural resource use and land tenure (Indirect).** Conflicts have led to arson, over-harvesting, and land conversion. Uncertainties over governance of natural resources and land tenure in Indonesia have led to violent clashes over access and ownership of these resources in numerous areas, including Aceh, Papua, West Kalimantan, and Central Sulawesi.

**Perverse policies (Indirect).** Poor policies lead to non-sustainable resource use, and confusion over authority, allowing for land conversion and wide scale pollution, resulting in loss of biodiversity and forest cover. The current ecological restoration concessions law provides little or no incentives to investors, particularly for non-peat forest, with low carbon value. The annual concession fee per hectare must be prepaid for 65 years, with no guarantee of return. This law is under revision, and this disincentive may be amended. Local governments have no incentives for protected area gazettement in the spatial planning process, as they will lose control to the central government. Energy policies encourage inefficiencies through subsidies, and there is a lack of incentives for private sector investment in renewable energy, resulting in higher GHG emissions.

**Lack of Enforcement/Political Will (Indirect).** Existing regulations are rarely enforced, and individuals that are arrested are rarely brought to trial. Motivation levels for local forestry officials are low and there are few incentives for them to engage in enforcement activities, given high levels of corruption, low pay, and risk of injury from angry crowds. This leads to the continuation and, indeed, increases in illegal activities, because people perceive that there is open access to resources. In addition, individuals are currently able to take advantage of confusion regarding decentralization of authority, conflicting legal regulations, and the weak or non-existing enforcement of land use regulations by both local governments and communities, to convert additional forested area. Illegal timber trade and hunting/trade in endangered species listed on CITES are both major problems as a result.

**Lack of Capacity (Indirect).** Lack of capacity is leading to poor decision-making and increased environmental degradation which will result in loss of biodiversity. Decentralization returned a significant portion of political control over natural resources to the provincial governments of Aceh and Papua, and district governments for the remaining provinces. The capacity of district and provincial governments to deal with both the policy and technical aspects of natural resource governance is variable, but generally lacking. Some communities are being empowered to participate in the decision-making process, but given their low educational levels, they may not have the capacity to participate fully and in an informed manner.

**Poor Governance and Organizational Structure (Indirect).** GOI institutional systems are poorly organized, with unclear regulations, and overlapping authority between departments. This leads to ineffective regulation of development activities and increased illegal activities resulting in environmental degradation and subsequent loss of biodiversity. Decision-making is not always transparent, and there has been significant

corruption, particularly in the natural resource sector. There is little or no confidence in government and official regulatory mechanisms to deal with natural resource issues and conflicts. This lack of clarity has led to a diffusion of responsibility resulting in a continuation of the “status quo” (poor environmental policy decisions) and poor enforcement.

### ***Interactions Amongst Threats***

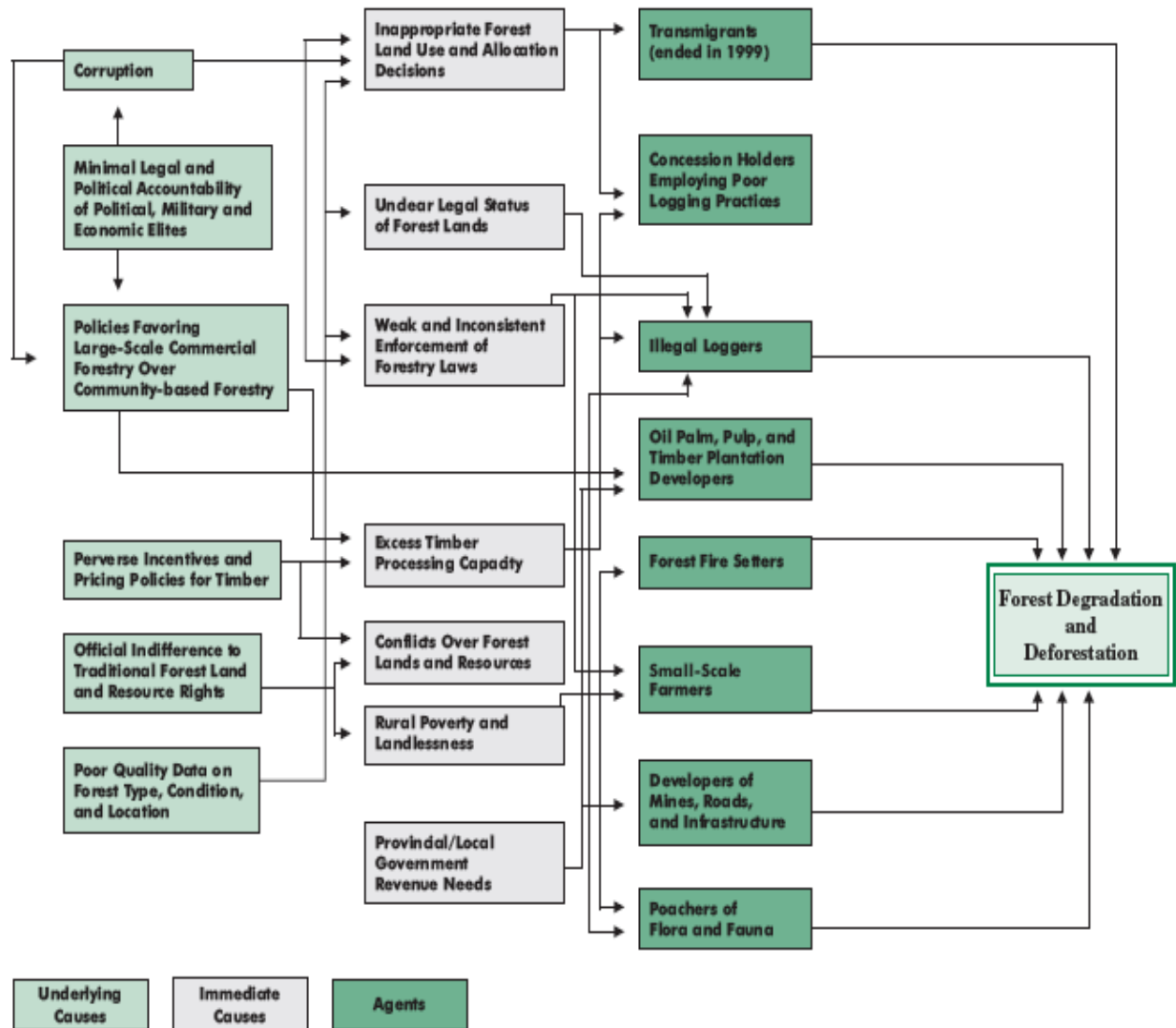
**Interactions amongst Threats in the Biodiversity Sector.** Threats are numerous and complex, and vary greatly between sites, not only in scale and magnitude, but also with respect to the types of drivers. For example, orangutans are hunted traditionally for food by indigenous people (predominantly Christian) in East Kalimantan. Underlying threats include lack of enforcement and capacity, plus lack of economic alternatives. Indigenous people are dependent upon the natural resource base for both sustenance and their livelihoods. Previously migrant peoples are now primarily settled and there are numerous examples of local extinctions due to hunting. Near Tanjung Puting, in Central Kalimantan, orangutans are killed as pests in agroforestry gardens and oil palm plantations. Land conversion, primarily illegal agricultural encroachment, has destroyed orangutan habitat, along with illegal gold mining. There are religious prohibitions for the predominantly Muslim community transmigrant community located there against eating primates, but this does not stop them from hunting orangutans.

**Interactions amongst Threats in the Forestry Sector.** These threats tend to act synergistically (see Fig. 5); corruption, poor spatial planning, industrial over-capacity, and perverse policies enable non-sustainable timber extraction. Logging concessions that do not implement reduced impact logging practices increase collateral damage from uncontrolled tree felling. Poorly sited extraction routes, and large amounts of remaining slash, also add to the fuel load and increase fire risk. Fire is also often used to cover the tracks of illegal loggers, burn local property claimants out, or to clear land. Fire-adapted species such as alang alang (*Imperata sp.*) prevents natural forest regeneration, with the end result a new climax community of grassland or shrub habitats (Goldammer, 1999). Much of the degraded alang alang grass land is located within the official forest estate, so there are no incentives for replanting by local communities as the land legally belongs to the GOI.

Roads, and forest and mining concessions, open access for small-scale agricultural encroachment and illegal logging. Once a concession is degraded (but still has standing tree cover), it becomes a target for conversion to oil palm plantation or pulp production. This occurs both legally or quasi-legally (though central or local government decrees) or illegally. Conversion forest ostensibly cleared for plantation establishment are frequently clear cut for quick profits from the timber, and then abandoned. TNC has estimated that approximately 70% of land allocated for palm oil has been fully cleared but never planted. New permits for oil palm are issued, without requiring use of already converted forest land.



**Figure 5. Drivers and Underlying Causes of Forest Degradation & Deforestation in Indonesia**



Source: GFW/FWI 2002.

**Interactions among Threats to the Marine Sector.** Elevated seawater temperatures, due in part to increased GHG emissions associated with climate change (Brown and Suharsono, 1990), and the El Niño Southern Oscillation severely degrade coral reefs through bleaching events. Poor land use policies and lack of appropriate spatial planning lead to the combination of sedimentation and nutrient loading from the forestry and agricultural sectors, one of the greatest threats to reef coral biodiversity (Edinger et al., 1999). Sea sand mining for exportation to Singapore for coastal reclamation projects is generating fine dust that damages the coral reefs. Lack of governance and poor enforcement, allow for the release of industrial and household pollutants. Primary pollution sources are urban, with lower levels of coral cover and fish diversity found near point sources. Pollution effects on corals endure until the stress or source is removed. Recovery from damage to reefs appears to require at least 10 years after restoring water

quality (Grigg, 1995). Pollution reduces the amount of *Acropora* coral, one of the more important reef builders, and causes a reduction in habitat complexity. Fish diversity is directly related to habitat complexity. Inter-connected habitats (coastal reefs, seagrass beds, and mangrove) appear to have cascade effects on fish assemblages; successful management requires knowledge of habitat interactions (Unsworth, et al., 2008). The combination of economic forces, such as market demand and lack of sustainable alternatives, and the lack of capacity (understanding of sustainable yields or the importance of maintaining reef integrity) often results in over-harvesting and destructive fishing practices that lead to reduced biodiversity and fisheries production. Indonesia is the world's largest exporter of living coral, further degrading its reef system through the exportation of over 800,000 pieces through 2005 (MoE, 2007).

## **F. USAID's Current Activities**

USAID assistance programs focus on basic services, including education, health care, clean water and sanitation under the President's Water for the Poor initiative, food and nutrition assistance, rebuilding after the tsunami, and watershed and biodiversity conservation. Programs also strengthen the justice and legislative sectors; address corruption; strengthen governance at national and local levels; promote civic dialogue and participation; promote peace and reconciliation work in such as Aceh; and tackle pervasive corruption. Indonesia's MCC Threshold Program supports reform, with anti-corruption efforts the centerpiece of the program.

Strengthening economic growth and creating employment by improving the business climate and financial services sector is also a major focus. This includes improving private sector competitiveness and the safety and soundness of the financial system, including deposit insurance, as well as increasing agricultural sector productivity, trade, and investment. Programs also seek to strengthen key GOI economic governance institutions in partnership with the private sector and civil society. Details concerning specific activities are given in Appendix IV.

## **G. Actions Necessary to Conserve Biological Diversity and Tropical Forests**

Indonesia (BAPPENAS) developed its National Biodiversity Strategy and Action Plan (IBSAP) in 2003. The major activities deemed necessary by the GOI to conserve its biodiversity, including forests, have been identified in this document. Major objectives, policy directions, and activities (summarized and condensed) are included in Appendix VI, and are from the following Convention on Biological Diversity (CBD) weblink: <http://www.cbd.int/countries/?country=id>. GOI's Strategy and Action Plan is extremely broad, addressing multiple sectors, threats, and stakeholders.

Activities to address climate change impacts, including mitigation and adaptation activities, are not specified in the IBSAP. This emerging threat, however, has become a national policy focus, leading to development of the National Action Plan on Climate Change (MoE, 2007) and the National Development Planning: Indonesia Responses to Climate Change (Triastuti, 2008). Indonesia is a leading proponent of REDD (Reduction

in deforestation and degradation) for carbon credits in the next iteration of the UNFCCC follow-on agreement on GHG emissions.

Based on the Threat Analysis, actions required to address major direct threats to forests include reducing deforestation, forest degradation, illegal logging, and fire. This can be achieved through targeted activities aimed at improving spatial planning, sustainable forest management, policy and governance, enforcement, financial incentives and prevention. Adaptation and mitigation measures to climate change need to be incorporated into forest management and planning.

Actions required to address direct threats to biodiversity include reducing over-harvesting, illegal hunting, destructive fishing practices, invasive species, and mining. Target activities that address awareness and capacity building, economic alternatives, improved management of forests and fisheries, and spatial planning.

## **H. Meeting Conservation Needs: Current and Recommended Actions**

### ***Current Actions by USAID and USG partners***

USAID programs designed to protect orangutans, their habitats, and important watersheds preserve some of the world's most highly valued biodiversity. Peatland forest is ideal orangutan habitat, so its conservation in Kalimantan and Sumatra is a "triple win", storing enormous carbon stocks underground, protecting valuable forests, and saving the endangered orangutan. USAID works with all stakeholders to develop land use agreements, conservation set-asides, and enforcement to reduce the rate of forest loss. USAID is improving local management of 82,000 hectares of high conservation value forests and facilitating the rehabilitation of 35,000 hectares of degraded forests in important watershed areas.

USAID has facilitated discussions between provincial governments and the World Bank, culminating in the governors of Aceh, Papua and Papua Barat provinces declaring logging moratoriums. Papua and Papua Barat provinces have committed to reallocating up to 5 million hectares of forests for carbon set-asides; these forests were originally slated for conversion to palm oil plantations and other uses.

Equipment, supplies and technical assistance for small-scale production of bio-fuel from *Jatropha curcas* (castor oil trees) is being provided by USAID in Flores, Nusa Tenggara Timur. *Jatropha* oil emits 78% less greenhouse gases than conventional diesel fuel, and thrives in dry marginal soils. *Jatropha curcas* may serve as an alternative to palm oil, thus reducing clearing of high-carbon, high biodiversity value forests for the creation of new oil palm plantations.

USAID is also facilitating consideration of the Tropical Forest Conservation Act (TFCA) for Indonesia. The TFCA would allow a portion of government debt to the U.S. to be reduced and redirected toward tropical forest conservation in Indonesia.

The State Department and the U.S. Trade Representative have negotiated the first Memorandum of Understanding on Combating Illegal Logging and Associated Trade with the Indonesian Government, and a number of activities are being implemented. The Department of Justice's International Criminal Investigative Training Assistance Program (ICITAP) Indonesia is working with the Indonesia Criminal Investigative Division and Marine Police to provide forensic kits and backpacks for investigators collecting forensic evidence for illegal logging cases. ICITAP is providing training and technical assistance to the Indonesian National Police in illegal logging interdiction and investigative strategies. U.S Forest Service and Customs and Border Protection are training Indonesian customs agents and police, while the Office of the U.S. Trade Representative is providing Indonesia with U.S. import data to help identify illegal exports of timber products from Indonesia. ICITAP is also working to train and educate prosecutors on building effective prosecution strategies for illegal logging cases.

The State Department contributed to a Heart of Borneo conservation initiative spearheaded by World Wildlife Fund. This program works to conserve a high biodiversity, trans-boundary area that includes parts of Indonesia, Malaysia and Brunei.

The Coral Triangle Initiative, supported by both USAID and the State Department, has just begun (FY2008). The marine and biological systems of the region bounded by Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands, and Timor-Leste will be protected through sustainable coastal resources management and marine conservation activities.

The USG supports special initiatives for orangutans, tigers, and elephants (US Fish and Wildlife grants, congressional earmarks) in Indonesia. Several international NGOs have received funding through these mechanisms.

The USAID Regional Office based in Thailand has several activities in Indonesia. These include:

- ECO-Asia Clean Development and Climate Program supports the development of common product quality standards for energy-efficient lighting manufactured in the region, and sharing of best practices and lessons learned for improving energy efficiency in coal-fired power plants.
- ECO-Asia Water and Sanitation is largely limited to utility-to-utility partnerships to enhance service delivery capability in close cooperation with the Environmental Services Program.
- Asian Environmental Compliance and Enforcement Network shares best practices on achieving improved environmental compliance and enforcement. Indonesia is currently interested in strengthening their judiciary to better assess damages resulting from incidences of pollution.
- Responsible Asia Forestry and Trade program has a significant presence in Indonesia, focusing on assisting about 20 timber concessions along a stepwise approach to timber certification on over 2 million hectares of forestland, primarily in Kalimantan. The program is also supporting finalization of national legality standards for Indonesia, conflict management training, and capacity building in

GIS technologies for sustainable forest management planning (with support from US Forest Service). An Indonesia-China-US Technical Working Group is working towards stimulating trade in credibly verified legal forest products.

- ASEAN Wildlife Enforcement Network is continuing to build capacities of a national-level Indonesian wildlife crime task force, including training workshops for environmental agencies, police, Customs, and the judiciary and participation in a Special Investigations Group facilitated by INTERPOL on smuggling of big cats and pangolins. Training materials are being produced in Bahasa Indonesia and institutionalized into relevant agencies. Public awareness activities and across-border cooperation between Indonesia and other ASEAN countries will be encouraged.

### ***Extent to Which Current USAID Actions Meet Needs***

USAID programs address many of the major threats to tropical forests and biodiversity, and are providing support for over half of the major activities identified by the IBSAP (see Appendix VI). In addition, watershed and forest conservation efforts, are helping to address carbon emissions contributing to climate change. USAID Indonesia programs are focused on some of the most critical geographic areas, with high levels of biodiversity and important tracts of high conservation value tropical forests, but there is continued enormous need. Where possible, USAID programs leverage other donors and stakeholders in order to magnify their efforts, but with additional funds, USAID could build substantially upon successful programmatic efforts to significantly increase impacts in selected target areas.

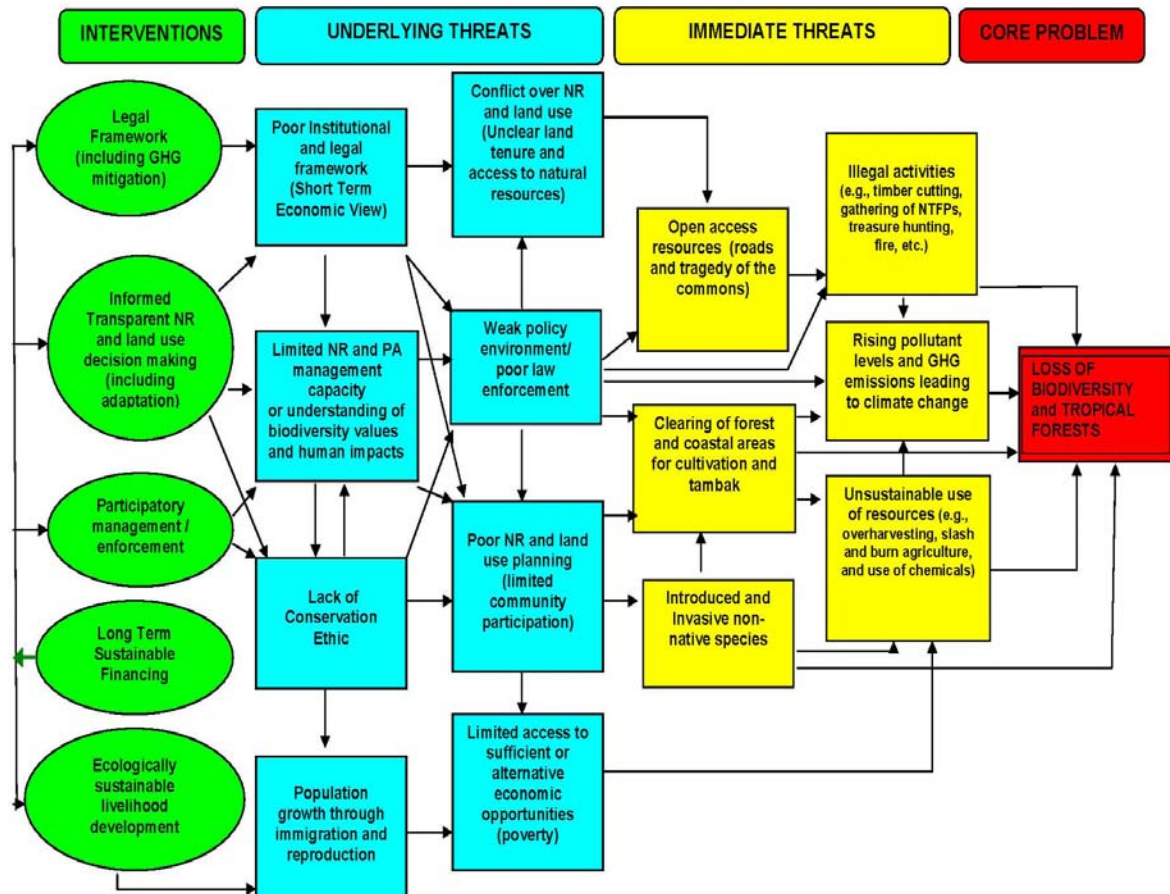
### ***Threats from Current and Proposed USAID activities***

USAID projects have conducted required Initial Environmental Examinations and Environmental Assessments as required under CFR 22, Regulation 216. Mitigation activities required under Reg. 216 are implemented by project partners, and compliance is monitored by the CTOs and the MEO for the Mission. The Mission currently has no specific plans for new construction/road development activities with major negative impacts in the new strategy, but this is still a possibility given the high incidence of natural disasters (e.g. floods, volcanic eruptions, earthquakes, tsunamis, landslides, and typhoons). Care should be taken to examine environmental impacts of future projects, including those dealing with policy, to avoid the creation of perverse incentives.

### ***Activity Selection and Recommended Actions to Mitigate Threats***

A conceptual model of how some of the major threats, underlying root causes and major activity types are interlinked is presented in Figure 6. Integrating national, regional, and site based activities can significantly reduce or mitigate threats. Suggested site-based activities described below, combined with national / regional technical support, could address all of the necessary interventions identified in the conceptual model.

**Figure 6. Conceptual Model**



USAID, however, has limited resources and will need to prioritize geographic and national level activities depending on funding levels and leverage opportunities. USAID activities should provide technical assistance and capacity building in support of sustainable resource use and best management practices, reductions in destructive fishing practices, improved local governance, appropriate spatial planning, and financial incentives (e.g., Payment for Ecosystem Services, voluntary carbon credits).

With respect to development of site-based activities, USAID should focus on the “Coral Triangle” and the geographic terrestrial areas with the highest levels of biodiversity and remaining forest cover. These were identified as Papua, Kalimantan, Sumatra, and Sulawesi in Table 9. In addition, there should be a bias towards peat swamp forest where possible, given its importance with respect to GHG emissions and climate change. The

Lacey Act provides a good entry point into forest governance issues and the reduction of illegal logging.

In addition to site based activities, USAID should invest in activities with good potential for large scale impact, that address multiple threats, and build upon USAID's strengths (as identified by partners) in capacity building, training, public information access, developing market incentives, and planning. USAID should also take advantage of growing private sector interest in the environment sector due to the new Corporate Social Responsibility legislation.

Specific activities finally selected should be based on stakeholder impact and engagement analyses to ensure effectiveness in reducing threats, and requires further site specific analyses (including threats). Potential site based activities might include:

### **Conserving Papua's Forests**

Papua is Indonesia's last great forest frontier. Constituting nearly 25% of Indonesia's land area, Papua is nearly 85% forested (World Bank 2006), and contains the largest remaining tropical forest in Southeast Asia, as well as many indigenous forest-dependent communities. While Papua's forests are relatively intact compared to other Indonesian islands, they are increasingly threatened by logging concessions and plans for major conversion of forest areas to oil palm plantations. The governor of Papua province is, however, attempting to leverage international interest in reducing greenhouse gas emissions from deforestation into an alternative development path for his province that will allow for both sustainable economic growth and forest conservation. USAID, therefore, has the opportunity to catalyze development of a sustainable development strategy for Papua before it follows the path of rapid deforestation that has befallen other major Indonesian islands.

### **Conserving Aceh's Forests**

The province of Aceh contains the largest intact forest areas on the island of Sumatra, including the Leuser Ecosystem (which contains Leuser National Park) in the south, and the Ulu Masen ecosystem in the north. These forests, which are home to some of Sumatra's last viable populations of orangutans, tigers, and elephants, are extremely high in biodiversity, and contain the major watersheds of northern Sumatra. These areas are highly threatened by illegal logging and land conversion, as well as the high demand for building timber from post-tsunami reconstruction efforts. As in Papua, Aceh's governor has committed to pursuing a development strategy that will conserve the biodiversity, watershed and carbon stock values of Aceh's forests – if the national government and the international community will provide the financial incentives and technical assistance to do so. USAID already has a strong presence in Aceh related to post-tsunami disaster relief and reconstruction assistance programs in place since 2005 and can provide the technical assistance required.

### **Conserving the Peat forests of Kalimantan and Sumatra**

Indonesia's peat forests are found mainly in south-central Kalimantan and along the east coast of Sumatra, principally in Riau province. Those in Kalimantan contain some of the world's most important orangutan habitat, while peat forests on both islands are areas of

extremely high biodiversity. These peat forests are among the highest priorities for reducing GHG emissions from deforestation, due to their exceptionally high carbon stocks and the perennial forest and land fires that occur in these areas. The peat forests are also an important arena for encouraging the private sector (e.g. oil palm, pulp and paper firms) to move towards more environmentally sustainable practices. These areas are under high threat levels from logging (both legal and illegal), draining and clearing, and poaching. USAID funding could leverage significant additional funding from other donors that have made commitments, including Australia (approximately \$30 million) and Germany (approximately \$35 million).

### **Conserving the “Heart of Borneo”**

The 220,000 km<sup>2</sup> “Heart of Borneo” region constitutes the remaining natural forests of Borneo’s mountainous interior. Most of it lies within Indonesia’s borders. The area has immense biological value, contains two of Indonesia’s largest protected areas, and is also the source for all major rivers on the planet’s third-largest island. In February 2007, the governments of Indonesia, Malaysia and Brunei concluded a tri-national agreement to work together on the conservation and sustainable management of HOB, and national action plans under that framework are currently being finalized. While some areas of HOB are remote, others face growing threats from oil palm development and from the plan to construct a “Northern Trans Kalimantan Highway” along the Indonesia-Malaysia border. This area has received significant financial and political support from the Department of State.

### **The Coral Triangle: Conserving the Coral Reef Ecosystems of Eastern Indonesia**

The coral reef ecosystems of Eastern Indonesia are among the most important components of the “coral triangle”, and are among the most biologically rich on the planet. While reefs in some parts of this area are relatively intact, threats are increasing, degraded reef areas are growing, and reef fisheries are being depleted. Climate change impacts on coral reefs are increasingly worrisome (e.g. coral bleaching events), and climate change adaptation is a key priority for these areas. As previously noted, the fisheries supported by Indonesia’s reefs and associated ecosystems are key local livelihood resources for often-poor coastal communities. A focus on select coral triangle sites thus provides an opportunity for a “triple win” approach, combining biodiversity conservation, adaptation to climate change, and sustainable management of fisheries. The recently-launched “Coral Triangle Initiative” provides an important political opportunity for effective action in these key coral reef ecosystems. USAID/Washington is already supporting conservation of two key sites in this area, and USAID/Indonesia has a long history – via the CRMP initiative – of effective engagement in coral reef ecosystem management.

### ***Opportunities for Linkages***

There are opportunities for linkages with the Health, Economic Growth, Education, and Democracy/Governance portfolios, as well as OFDA, RDMA, and other USG partners. Some potential linkages include:

- **Health:** Increasing water flow and quality through watershed protection, reduction in siltation through improved agriculture/land use practices, financing for watershed



management and distribution systems through “Payment for Ecological Services”, and reduction in water and air pollution through the implementation of best practices.

- **Economic Growth:** Improving agricultural productivity through ecosystem services (e.g. pollination, reduced pest infestation), financial incentives to decrease environmental degradation in buffer zones, and financing for forest management through carbon markets.
- **Education:** Increasing environmental education, and scholarships for higher education (M.S. and Ph.D.s). (This will improve adoption of best environmental practices, and increased education levels leads to improved economic opportunities, reduced dependence on the NR sector, and increased local capacity to sustainably manage resources.)
- **Democracy/Governance:** Building transparency, capacity, and clarifying legal framework in the natural resource and environmental sector, and reducing conflict through equitable access to natural resources. There is a specific opportunity to work in Papua with respect to Integrated Spatial Planning.
- **OFDA:** Reducing risks from natural disasters through web based environmental monitoring, and reducing risks from flooding and landslides through better watershed management.
- **DOJ:** Improving enforcement of environmental regulations through information sharing, capacity building, seizures of illegal timber and prosecution, and support of the judicial system.
- **RDMA:** Improving conservation and sustainability of the Coral Triangle through the Coral Triangle Initiative, and improving access to environmental information for decision-making through co-funding of web-based interactive sites.

#### ***Extent to Which Proposed USAID Actions Meet Needs***

The Coral Triangle Initiative and a proposed new forestry initiative will address many of the highly ranked threats to biodiversity (marine and terrestrial) and forestry. USAID activities will support sustainable resource use and best management practices, reductions in destructive fishing practices, improved local governance, appropriate spatial planning, financial incentives (e.g., Payment for Ecosystem Services, voluntary carbon credits), and private sector partnerships.

The Coral Triangle Initiative will substantially increase USAID’s geographic impact in the marine sector. An activity to develop an integrated spatial plan for Papua province was just launched, and will help conserve a significant area of frontier forest and its biodiversity. The new forestry initiative will most likely focus on large forest blocks, and lowland peat forest, an area important for biodiversity and reducing carbon emissions.

Implementation of these activities will make a significant contribution to conserving Indonesia’s biodiversity and forests in specific sites. At current planned funding levels, USAID Indonesia can not meet Indonesia’s need, and must leverage other donors, the GOI, private sector, NGOs and communities to achieve USAID’s objectives. With additional funds, USAID could build substantially upon successful programmatic efforts to significantly increase impacts in selected target areas.

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## **J. Appendices**

I.	Abbreviations and Acronyms	48
II.	List of Species Priorities for GOI	50
III.	List of Invasive Species	54
IV.	List of Specific USAID Activities	55
V.	Anthropogenic threats to biodiversity and forests in Indonesia	60
VI.	Actions Deemed Necessary by GOI to Conserve Biological Diversity and Tropical Forests	64
VII.	USAID engagement in major activities identified by IBSAP to mitigate threats.	68
VIII.	Potential Actions to Mitigate Threats	71
IX.	Potential Activity Descriptions	74
X.	List of Contacts	82

## **Appendix I. List of Acronyms**

ADB	Asian Development Bank
AFPA	American Forest and Paper Association
ASEAN	Association of Southeast Asian Nations
BP	Beyond Petroleum (British Petroleum)
BPS	Badan Pusat Statistik (Indonesian Bureau of Statistics)
BHS	Basic Human Services
CBD	Convention on Biological Diversity
CBO	Community based organization
CIFOR	Center for International Forestry Research
CIDA	Canadian International Development Agency
CFR	Code of Federal Regulations
CI	Conservation International
CRMP	Coastal Resources Management Program
CTO	Cognizant Technical Officer
DFID	Department for International Development (United Kingdom)
DFNS	Debt for Nature Swap
DKP	Ministry of Marine and Fisheries
DOJ	Department of Justice
ECO-Asia	Environmental Cooperation-Asia
EU	European Union
FAA	Foreign Assistance Act
FAO	Food and Agriculture Organization (of the United Nations)
FFI	Fauna and Flora International
FLEG	Forest Law Enforcement and Governance
FSC	Forest Stewardship Council
FWI	Forest Watch Indonesia
GEF	Global Environmental Facility
GFTN	Global Forest Trade Network
GFW	Global Forest Watch
GHG	Greenhouse gas
GOI	Government of Indonesia
GTZ	German Technical Cooperation
IBRA	Indonesia Bank Restructuring Agency
IBSAP	Indonesian National Biodiversity Strategy and Action Plan
ICITAP	International Criminal Investigative Training Assistance Program
ICEL	International Council for Environmental Law
ICRAF	International Center for Research in Agroforestry
ITTO	International Tropical Timber Organization
IUCN	World Conservation Union

IUPJL	Environmental Service Utilization permit/license
KEHATI	Indonesian Biodiversity Foundation
LEI	Indonesian Ecolabeling Institute
LLRX	Law Library Resource Xchange
MEO	Mission Environment Officer
MoF	Ministry of Forestry, GOI
MoE	Ministry of Environment, GOI
MPA	Marine protected area
MPR	Indonesian People's Consultative Assembly
NASA	Air and Space Administration
NGO	Non-governmental organization
NRM	Natural resource management
OFDA	Office of Foreign Disaster Assistance
OFI	Orangutan Foundation International
PA	Protected area
PEFC	Program for Endorsement of Forest Certification
Pelangi	Environmental NGO that addresses GCC and Energy
PES	Payment for ecosystem services
RDMA	USAID Regional Development Mission for Asia
REDD	Reducing Emissions from Deforestation and Degradation
SERVIR	Spanish acronym for Regional Visualization and Monitoring System
TELEPAK	Indonesian environmental NGO
TFCA	Tropical Forest Conservation Act
TNC	The Nature Conservancy
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
US	United States of America
USAID	US Agency for International Development
USG	US Government
USTR	US Trade Representative
WALHI	Friends of the Earth Indonesia
WARSI	Indonesian Conservation Community
WWF	World Wildlife Fund or World Wide Fund for Nature Indonesia



## Appendix II. Government of Indonesia Priority Species

<b>Birds (Highest Priority)</b>	
Indonesian Local Name	Species
Maleo sekanwor	<i>Macrocephalon maleo</i>
Gosong maluku	<i>Eulipoa wallacei</i>
Curik Bali	<i>Leucopsar rotschildi</i>
Seriwang sangihe	<i>Eutrichomyias rowleyi</i>
Kuau kerdil	<i>Polypectron</i> spp.
Sempidan	<i>Lophura</i> spp.
Kakatua	<i>Cacatua</i> spp.
Kakatua	<i>Probosciger aterrimus</i>
Elang	<i>Spizaetus bartelsi</i>
Elang	<i>S. floris</i>
Elang	<i>S. lanceolatus</i>
Elang	<i>Ictinaetus malayanus</i>
Cenderawasih	<i>Paradisea rubra</i>
Cenderawasih	<i>Paradigalla carunculata</i>
Cenderawasih	<i>Dyphilodes respublica</i>
Rangkong	<i>Bucerotidae</i> family
Nuri dan Perkici	<i>Psittacidae</i>
Kuau raja	<i>Argusianus argus</i>
<b>Birds (High Priority)</b>	
Mentok rimba (Itik serati)	<i>Cairina scutulata</i>
Mambruk	<i>Goura</i> spp.,
Beo Nias (Tiong emas)	<i>Gracula religiosa</i>
Ayam-hutan hijau	<i>Gallus varius</i>
Jalak putih	<i>Sturnus melanopterus</i>
Merak hijau	<i>Pavo muticus</i>
Betet jawa	<i>Psittacula alexandri</i>
Gelatik jawa	<i>Padda oryzivora</i>
Anis	<i>Zoothera</i> spp.
Paok	<i>Pitta</i> spp.,
Pelatuk	<i>Picidae</i> Family
Celepuk	<i>Otus</i> spp.,
Raja udang	<i>Alcedinidae</i> Family
Bangau and Ibis	<i>Ciconiidae</i> Family and <i>Threskiornithidae</i> Family
<b>Mammals (Highest Priority)</b>	
Badak sumatera	<i>Dicerorhinus sumatraensis</i> ,
Musang Sulawesi	<i>Macrogalidia muschenbroekii</i>
Babi kutil	<i>Sus verrucosus</i>
Harimau sumatera	<i>Panthera tigris sumatrae</i>
Gajah sumatera	<i>Elephas maximus</i>
Babirusa	<i>Babirousa babyrussa</i>
Anoa dataran tinggi	<i>Bubalus quarlesi</i>
Anoa dataran rendah	<i>Bubalus depressicornis</i>

<b>Mammals (High Priority)</b>	
Kambing gunung	<i>Capricornis sumatraensis sumatraensis</i>
Banteng	<i>Bos javanicus</i>
Gajah Kalimantan	<i>Elephas maximus borneensis</i>
Beruang madu	<i>Helarctos malayanus</i>
Badak jawa	<i>Rhinoceros sondaicus</i>
Tutul jawa	<i>Panthera pardus melas</i>
Tapir	<i>Tapirus indicus</i>
<b>Primates (Highest Priority)</b>	
Orang utan sumatera	<i>Pongo abelii</i>
Bokoi	<i>Macaca pagensis</i>
Bilou	<i>Hylobates klosii</i>
Joja	<i>Presbytis potenziani</i>
Simakobu	<i>Simias concolor</i>
<b>Primates (High Priority)</b>	
Lutung banggat	<i>Presbytis hosei</i>
Lutung natuna	<i>Presbytis natunae</i>
Owa jawa	<i>Hylobates moloch</i>
Orang utan kalimantan	<i>Pongo pygmaeus</i>
Bekantan	<i>Nasalis larvatus</i>
Surili	<i>Presbytis comata</i>
<b>Reptiles (Highest Priority)</b>	
Kura-kura rote	<i>Chelodina mccordi</i>
Kura-kura bintang	<i>Chitra chitra</i>
Kura-kura sulawesi	<i>Leucocephalon yuwonoi</i>
Baning kuning	<i>Indotestudo forstenii</i>
Bajuku, Tuntong	<i>Callagur borneoensis</i>
Biuku	<i>Batagur baska</i>
Biawak biru	<i>Varanus melinus</i>
Biawak merak	<i>Varanus auffenbergi</i>
Ular python maluku	<i>Morelia clastolepis</i>
Ular python Halmahera	<i>Morelia tracyae</i>
Ular python kerdil Tanimbar	<i>Morelia nauta</i>
Buaya siam	<i>Crocodylus siamensis</i>
Katak barbourula	<i>Barbourula kalimantanensis</i>
Katak pohon merah	<i>Nyctixalus margaritifer</i>
Kodok merah	<i>Leptophryne cruentata</i>
Kodok klaviger	<i>Bufo claviger</i>
<b>Reptiles (High Priority)</b>	
Kura-kura irian	<i>Chelodina gunaleni</i>
Kura-kura reimani	<i>Chelodina reimanni</i>
Sanca macklot	<i>Liasis mackloti</i>
Ular python	<i>Python curtus</i>
Biawak timor	<i>Varanus timorensis</i>
Buaya sinyulong	<i>Tomistoma schlegelii</i>

<b>Insects (Highest Priority)</b>	
	<i>Atrophaneura palu</i>
	<i>Graphium stresemani</i>
	<i>Idea tambusisiana</i>
	<i>Euploea albicosta</i>
	<i>Euploea caespes</i>
	<i>Euploea tripunctata</i>
	<i>Ideopsis hewitsonii</i>
	<i>Parantica kuekenthali</i>
	<i>Parantica marcia</i>
<b>Insects (High Priority)</b>	
	<i>Polyura dehaani</i>
	<i>Bombus rufipes</i> ,
	<i>Apis koschevnikovi</i>
	<i>Apis andreniformis</i>
<b>Marine and Freshwater Species (Highest Priority)</b>	
Pesut mahakam	<i>Orcaella brevirostris</i>
Kima raksasa	<i>Tridacna gigas</i>
Duyung	<i>Dugong dugong</i>
Arwana papua	<i>Scleropages jardinii</i>
Ikan belida	<i>Notopterus chitala</i>
Ikan batak	<i>Neolissochilus thienemanni</i>
Kardinal banggai	<i>Pterapogon kauderni</i>
Ikan napoleon	<i>Cheilinus undulatus</i>
Kima lain	<i>Tridacna gigas</i> (6 species)
Teripang pasir	<i>Holothuria scabra</i> and 25 other teripang species
<b>Marine and Freshwater Species (High Priority)</b>	
Kerang lola	<i>Trochus niloticus</i>
Kuda laut	<i>Hippocampus</i> spp.
Penyu laut	(6 spesies)
Nautilus	<i>Nautilus</i> spp.
Kepiting kenari	<i>Birgus latro</i>
Ke Ikan raja laut	<i>Latimeria menadoensis</i>
Hiu	Superorder <i>Selachimorpha</i>
Pari	Superorder <i>Batoidea</i>
Siput mata bulan	<i>Turbo marmoratus</i>
Ubur-ubur Pulau Kakaban	<i>Cassiopeia ornata</i> , <i>Mastigias papua</i> , <i>Aurelia aurita</i> , and <i>Tripedalia cystophora</i>
Koral merah	<i>Corallium rubrum</i>

<b>Plants (Highest Priority)</b>	
Pelalar	<i>Dipterocapus littoralis</i>
Palem ekor ikan	<i>Hydriastele flabellata</i>
Kalapia	<i>Kalappia celebica</i>
Anggrek ekor tikus	<i>Paraphalaenopsis</i> spp.
Rafflesia	<i>Rafflesia</i> spp.
Resak banten	<i>Vatica bantamensis</i>
Resak bribes	<i>Vatica javanica</i>
	<i>Nothofagus womersleyi</i>
Kayu hitam	<i>Dyospyros celebica</i>
Kayu susu	<i>Alstonia beatricis</i>
Bintangur	<i>Calophyllum insularum</i>
	<i>Guioa waigeoensis</i>
Saninten	<i>Castanopsis argentea</i>
<b>Plants (High Priority)</b>	
Anggrek bulan raksasa	<i>Phalaenopsis gigantea</i>
Kawoli	<i>Alloxylon brachycarpus</i>
Bintangur	<i>Calohpyllum papuanum</i>
Bintangur	<i>Calophyllum euryphyllum</i>
Bintangur	<i>Calophyllum carii</i>
Nyatoh	<i>Manilkara kanosiensi</i>
Mendarahan	<i>Myristica rumphii</i> var. <i>Florentis</i>
Kantung semar	<i>Nepenthes</i> spp.
Tualang	<i>Koompasia grandiflora</i>

*Revised from GOI, 2008*

### Appendix III. List of Invasive Species in Indonesia

Local Name	Species	Family	Origin
<i>Unknown</i>	<i>Acacia nilotica</i>	Mimosaceae	Africa & Continental Asia
Semak merdeka, putihan	<i>Chromolaena odorata</i>	Asteraceae	C. & S. America
Eceng gondok	<i>Eichornia crassipes</i>	Pontederiaceae	Tropical S. America (Brazil)
Babakoan	<i>Eupatorium sordidum</i>	Asteraceae	Mexico
Ganggang	<i>Hydrilla verticillata</i>	Hydrocharitaceae	Asia
Tahi ayam	<i>Lantana camara</i>	Verbenaceae	Tropical America
Pohon payung	<i>Maesopsis eminii</i>	Rhamnaceae	Tropical Africa
Caputuheun, sembung rambat	<i>Mikania micrantha</i>	Asteraceae	C. & S. America
Putri malu	<i>Mimosa diplotricha</i>	Mimosaceae	Tropical & Subtropical America (Brazil)
Klampus air, putri malu raksasa	<i>Mimosa pigra</i>	Mimosaceae	Tropical America
Si kejut, putri malu	<i>Mimosa pudica</i>	Mimosaceae	Tropical America/ S. America
<i>Unknown</i>	<i>Myriophyllum aquaticum</i>	Haloragaceae	S. America
Konyal, Markisa	<i>Passiflora edulis</i>	Passifloraceae	Brazil
Buah susu, markisa leutik	<i>Passiflora laurifolia</i>	Passifloraceae	S. America
Rumput jurig	<i>Pennisetum polystachion</i>	Poaceae	Tropical Africa
Sirih hutan	<i>Piper aduncum</i>	Piperaceae	S. America
Kiambang, apu-apu	<i>Pistia stratiotes</i>	Araceae	<i>uncertain</i>
Karamunting	<i>Rhodomyrtus tomentosa</i>	Myrtaceae	SE. Asia & W.-half of Malaysia
Alang-alang, ilalang	<i>Imperata cylindrica</i>	Poaceae	Tropical Asia
Sidagori	<i>Sida acuta</i>	Malvaceae	Australia
Tusuk konde	<i>Spagneticola trilobata</i>	Asteraceae	Tropical America
Rumput banggala	<i>Urochloa maxima</i>	Poaceae	Africa
Mujair	<i>Tilapia mozambica</i>	Cichlidae	Afrika
Gabus Toraja di Papua	<i>Channa striata</i>	Chanidae	Sulawesi
Keong Mas	<i>Pomace caniculata</i>	Pomacidae	Afrika Selatan, China

Source: SEAMEO, Biotrop, 2007

## **Appendix IV. USAID Current Activities**

### ***Specific Activities: Delivering Quality Basic Human Services to Communities***

#### Health Services

The program focuses on providing technical assistance regarding: maternal and neonatal health; reproductive health; child health and nutrition; prevention of infectious diseases including HIV/AIDS, tuberculosis and malaria; decentralization of the health sector and improvement of personal hygiene practices.

#### Safe Water and Environmental Services

USAID supports better health through improved water resource management and expanded access to clean water and sanitation services. In the upper watershed, the program promotes forest management, biodiversity conservation (including orangutan conservation) and land use planning to protect a steady, year-round source of clean water. Further downstream, the program strengthens municipal water utilities to improve and expand piped water and sanitation services to communities. Stakeholder forums link upstream and downstream communities to build consensus on water and waste management issues. Marginalized urban communities also benefit from the introduction of safe drinking water through *Air Rahmat*, a home chlorination product introduced to the market through a public-private partnership.

#### Marine

A new program, the Coral Triangle Initiative, is just starting focusing on improved conservation and sustainable management of marine and coastal resources in the Coral Triangle region.

#### Food Security and Nutrition

USAID food assistance targets poor communities; directly benefiting women and children with supplemental feeding, and information campaigns on balanced diets, vitamins and other nutrition topics. The food assistance program also works closely with local communities in the construction of public facilities, latrines, washing facilities, water supplies and in designing solid waste disposal systems to protect community health.

#### Disaster

USAID's Disaster Program strengthens emergency preparedness and capacity for response within Indonesia. It is providing training and technical assistance to first responders, as well as supporting monitoring and forecasting of severe climate events, flooding, earthquakes, tsunamis, and volcanic eruptions. It provides emergency food, water, and support to disaster victims at the request of the Indonesian Government.

### ***Specific Activities: Avian Influenza (AI)***

#### Preparedness and Control

USAID's AI program supports the Government of Indonesia's *National Strategy for Avian Influenza Control and Preparedness for Human Pandemic Influenza 2006-2008*. USAID's program facilitates coordination among all levels and sectors of the

government, and provides training on disease indicators to enhance local capacity to detect signs of an outbreak.

#### Animal Surveillance and Response

USAID is training animal health teams in surveillance, containment, and prevention skills.. Animal sector activities are integrated with human health through direct reporting of poultry outbreaks to local health officers and through program collaboration.

#### Human Influenza Surveillance

USAID is building Ministry of Health capacity to integrate active human surveillance and response with animal surveillance. The program works to reduce human infections and improve survival outcomes by initiating case detection within 24 hours of animal outbreak confirmation and getting suspect patients into appropriate care. Village volunteers are trained to educate their communities and reduce risky behaviors.

#### Behavior Change Communications

USAID is supporting the National AI Commission to develop key messages, mass media campaigns, and materials for direct communications for AI prevention and control. Communications tools are being used to enhance public awareness and promote safe poultry rearing practices, thereby limiting the spread of AI among poultry and minimizing the risk of transmission to people.

#### Research

USAID is working with the International Livestock Research Institute to conduct operational research to identify the most effective avian influenza control measures in poultry. The epidemiological impact of various control strategies utilizing the Participatory Disease Surveillance and Response Program is being measured, and the feasibility of replicating those control measures throughout Indonesia is being assessed. The first mass vaccination campaign commenced July 2008.

#### ***Specific Activities: Effective Democratic and Decentralized Governance***

##### Mitigation of Conflict and Support for Peace

USAID supports conflict-sensitive technical assistance approaches to development, technical capacity building, livelihood development, civil society and academic input in relevant legislative drafting and transition assistance to conflict-affected persons.

##### Justice Sector Reform

USAID supports the bureaucratic reform efforts of the Attorney General's Office through technical assistance and training for prosecutors. USAID also works with the Supreme Court and Constitutional Court with the overriding aim of developing a more effective, professional, transparent, accountable and independent judicial branch.

##### Legislative Strengthening

USAID provides institutional support to the National House of Representatives, National Regional Representative Council, and district-level legislative councils. Activities include: promoting constituency and media outreach; developing the capacity to draft and

analyze legislation and operational budgets and supporting legislative commissions to carry-out their functions.

#### Local Governance Strengthening and Decentralization Support

USAID supports Indonesia's decentralization by helping local governments become more democratic, more competent at the core tasks of governance, and more capable of managing public services and resources. The program offers technical assistance in participatory planning, budgeting, financial management and management systems. At the national level, USAID supports the improvement of decentralization laws, policies and regulations.

#### Elections and Political Processes

USAID supports the upcoming 2009 Parliamentary Presidential elections through: political party development, election administration, voter education, election monitoring and oversight and strengthening of the legal framework.

#### Promoting Democratic Culture

USAID promotes a democratic culture through: civic education, advocacy, engaging traditional leaders, building networks to support tolerance and pluralism, and assisting the government in reviewing policies that may conflict with the constitution and human rights standards.

#### Fighting Trafficking in Persons

USAID is assisting the Government of Indonesia (GoI) and civil society to develop policies and procedures to prevent trafficking in women, girls and men and provide protection to survivors of trafficking.

#### ***Specific Activities: Improving the Quality of Education***

##### Decentralized Basic Education

USAID focuses on improving the quality and relevance of basic education in primary and junior secondary schools. The program is assisting local governments and communities to manage education services more effectively. Technical assistance is provided to enhance teaching and learning in key subjects such as math, science and reading. USAID's program also promotes the use of information technology for education, the importance of early childhood education, in-service teacher training, and non-formal work/life skills.

##### Opportunities for Vulnerable Children

This program promotes inclusive education in Indonesia by helping prepare special needs children to be educated in public schools.

##### Sesame Street Indonesia / Jalan Sesama

In partnership with the Sesame Workshop, USAID is supporting the development of a new Indonesian co-production of the renowned *Sesame Street* television show.



### Higher Education

The Indonesia Education Initiative provides a range of educational scholarships and exchanges, and English language learning opportunities. USAID is supporting the development of the Aceh Polytechnic, a new institution to provide quality education in applied technology fields such as information technology and electrical engineering, and helping three Indonesian Universities to upgrade their academic programs in areas critical for economic growth such as engineering, agriculture and education.

### ***Specific Activities: Economic Growth Strengthened and Employment Created***

#### Improving the Investment and Trade Climate

USAID works to create and maintain a transparent and uniform legal and regulatory business climate to eliminate the “hidden costs” of doing business and reduce corruption. It provides technical assistance to enhance the capacity of courts to handle corruption and commercial cases, support trade sector reforms; streamline business start-up procedures and promote good governance.

#### Increasing the Competitiveness of Agribusinesses and SMEs

USAID is working to improve the competitiveness of key light manufacturing and agribusiness sub-sectors in an effort to develop trade capacity, create jobs, and fuel growth.

#### Enhancing Financial Sector Reforms

USAID assistance to Indonesia’s key financial sector institutions includes building a sound financial infrastructure, creating a modern deposit insurance system, developing the capacity of insurance industry professionals, and combating financial crime such as money laundering and terrorism financing.

### ***Specific Activities: Tsunami Reconstruction***

#### Rebuilding Shelter and Key Infrastructure

USAID is reconstructing major infrastructure that will benefit the entire Province, including the Aceh West Coast Highway, educational facilities, clinics, homes, and public buildings. USAID is also helping the local water utility company rehabilitate and improve operational procedures, management and financial efficiency as well as increase water distribution in major municipalities.

#### New Houses for Internally Displaced Persons

USAID is supporting the building of homes to house internally displaced people, including training Indonesian NGOs to build houses, and design and construct environmentally sound sanitation facilities for relocated villages.

#### Restoring Livelihoods and Basic Services

USAID is providing technical assistance to communities to generate employment and restart or launch new businesses. Other activities promote health, hygiene, and access to clean water.

#### Generating jobs and income for Acehese farmers

USAID is training farmers in organic coffee production and establishing coffee processing facilities. A similar agribusiness program is promoting the production and marketing of patchouli oil.

#### The Aceh Polytechnic

USAID is helping construct the Aceh Polytechnic, a post-secondary institution for education in technical areas such as electrical engineering and information technology.

#### Assisting Key Reconstruction Coordination Efforts

USAID has provided technical assistance to the Aceh Rehabilitation and Reconstruction Agency on housing policy, communications, disaster preparedness, logistics and anti-corruption.

#### Increasing Accountability and Transparency

The Local Governance Support Program has trained Acehese local government officials, legislators and community leaders in planning, budgeting, and management.

#### ***Specific Activities: Millennium Challenge Corporation (MCC)***

##### Reform the Judiciary

The MCC Threshold Program is training judges on the newly adopted Judicial Code of Conduct, publishing Supreme Court decisions on an on-line website, helping implement public complaint procedures, and developing guidelines and monitoring procedures.

##### Improve the Capability of the Financial Transaction Reports and Analysis Center

Improvements are being made to the detection and reporting of suspicious transactions that may indicate money laundering activity, and the capacity of the Financial Transaction Reports and Analysis Center to receive and analyze online financial reports.

##### Improve the Capability of the Corruption Eradication Commission

The MCC Threshold program is providing equipment and training to improve the Corruption Eradication Commission's technical capabilities to investigate and prosecute corruption cases. The program is also expanding data collection for Transparency International's Corruption Perception Index.

##### Implement Electronic Government Procurement

Five regional government electronic procurement centers are being created.

##### Increase Immunization Rates - Build Capacity and Public Awareness

The MCC Threshold program is providing technical and management training for health-care providers on epidemiology, surveillance, mid-level management, financial sustainability, integrated health planning, and budgeting. Monitoring of vaccination coverage, availability of quality vaccine supplies, and program results is being improved. Advocacy for routine immunization services and surveillance systems for other vaccine-preventable diseases is being improved and expanded.

## **Appendix V. Anthropogenic threats to biodiversity and forests in Indonesia.**

### **KEY:**

#### **Scale / Magnitude of impacts:**

<i>Impact magnitude:</i>	N = no impact	M = medium impact
	L = low impact	S = severe impact
<i>Impact on:</i>	C = ecological community	I = individual species
<i>Impact scale:</i>	1 = 0 ha to 999 ha	
	2 = 1,000 ha to 9,999 ha	
	3 = 10,000 ha to 99,999 ha	
	4 = 100,000 ha to 999,999 ha	
	5 = 1,000,000 ha to 9,999,999 ha	
	6 = 10,000,000 ha to 99,999,999 ha	
	7 = $\geq$ 100,000,000 ha	

#### **Source of threat is Direct (D) or Indirect (I)**

#### **Timeframe (to onset of impacts and duration):**

<i>Impact onset:</i>	I = immediate = less than 6 months
	S = short term = 6 months to one year
	M = medium term = one to five years
	L = long term = over five years
<i>Impact duration:</i>	T = impacts are temporary, once threat is removed
	E = impacts are enduring, will continue after threat is removed

#### **Feasibility of intervention for USAID:**

F = Feasible, human/financial resources available and well documented successful interventions in previous USAID projects

U = unknown, resources available, but successful interventions are limited (USAID or others)

N = not feasible, resources required are greater than available, and successful interventions not documented or limited

#### **Rank (based on severity and scale of threat at community level and probable outcome of intervention feasible for USAID):**

- 1 = severe impact, scale 6 or above (or degrades 75% of habitat), feasible or unknown
- 2 = severe impact, scale 5 (or degrades 50% of habitat), feasible or unknown,  
medium impact scale 6 or above (or degrades 75% of habitat), feasible or unknown
- 3 = severe impact, scale 4 (or degrades 50% of habitat), feasible or unknown  
medium impact scale, scale 5 (or degrades 75% of habitat), feasible or unknown
- 4 = severe impact, scale 3, feasible or unknown  
medium impact, scale 4 (or degrades 75% of habitat), feasible or unknown
- 5 = severe impact, scale 1 or 2, feasible or unknown  
medium impact, scale 3 or above (or degrades 75% of habitat), unknown
- 6 = remaining categories

### Anthropogenic threats

Type threat	Major Environmental Impacts	Scale of impacts	Time-frame	Feasibility	Rank
Climate Change <b>D and I</b>	May lead to increased droughts, floods, species extinctions, coral reef bleaching, ocean acidification, large scale loss of biodiversity and forest cover	SC7	LE	Adaptation F Mitigation U	1
Land Conversion (from forest to non-forest) <b>D</b>	Alters nutrient cycles; alters hydrological cycles; increases sedimentation; introduction of toxins; loss of biodiversity through conversion for agriculture, shrimp ponds, plantations, or infrastructure	SC6	LE	F or U	1
Fire <b>D</b>	May reduce biodiversity through causing local extinctions; Alters nutrient cycles; Alters hydrological cycles; increased carbon emissions particularly from peat fires and coal fires	SC6	IT or IE	F	1
Destructive fishing practices <b>D</b>	Over-harvesting, leading to extinctions, coral reef degradation, loss of biodiversity	SC7	IE or IT	U	1
Population growth (immigration and reproduction) <b>I</b>	Increases loss of biodiversity through land conversion; Increases local resource extraction and may lead to environmental degradation; Increases pollution	MC7 to SC7	ME or LE	F	1
Lack of appropriate land use planning <b>I</b>	May lead to increased pollution, erosion, flooding, sedimentation, landslips, and loss of biodiversity	MC7 to SC7	MT	F	1
Hunting <b>D</b>	May reduce biodiversity through local extinctions	SI7 MC7	MT	F	2
Logging – Large Scale <b>D</b>	Alters microclimate; Damages resource base for some species; contributes to GHG emissions; increased sedimentation*	MC6	IT	F	2

Type threat	Major Environmental Impacts	Scale of impacts	Time-frame	Feasibility	Rank
Over-harvesting <b>D</b>	May reduce biodiversity through local extinctions (terrestrial, freshwater, and marine)	SI6 MC7	MT	F	2
Roads <b>D</b>	Interferes with dispersal/ migration routes; Opens area up to increased hunting, logging and agriculture	SC5	IE	F	2
Mining – small scale <b>D</b>	Alters nutrient cycles; alters hydrological cycles; increases sedimentation; introduction of toxins	SC5	IE	F	2
Mining <b>D</b>	Alters nutrient cycles; alters hydrological cycles; increases sedimentation; introduction of toxins	SC5	IE	F	2
Introduced species <b>D</b>	May reduce biodiversity through causing local extinctions; May clog waterways	SI7, MC5 to SC5	ME	F	2
Heavy industry <b>D</b>	Alters nutrient cycles; alters hydrological cycles; increases sedimentation; introduction of toxins; mudflows, loss of biodiversity through land conversion	SC5	MT or ME	F	2
Aquifer depletion/ contamination <b>D</b>	Alters hydrological cycles; pollution; loss of biodiversity	MC7	variable	F	2
Economic (e.g. markets) <b>I</b>	May lead to non-sustainable harvesting of resources	MC7	MT or ME	F	2
Conflict over access to natural resources <b>I</b>	May lead to non-sustainable harvesting of resources and destruction of natural resources through violence	MC5 to SC5	IE or IT	F	2
Perverse policies <b>I</b>	May lead to over-harvesting; increased environmental degradation; pollution; loss of biodiversity	MC7	MT or ME	U	2
Lack of enforcement/ political will <b>I</b>	May lead to over-harvesting, increased pollution, and loss of biodiversity	MC7	MT	F	2

Type threat	Major Environmental Impacts	Scale of impacts	Time-frame	Probable outcome	Rank
Lack of capacity <b>I</b>	May lead to over-harvesting, increased pollution, and loss of biodiversity	MC7	MT	F	2
Poor governance and org. structure <b>I</b>	May lead to over-harvesting, increased pollution, and loss of biodiversity	MC7	MT	F	2
Infrastructure development <b>D</b>	Increased environmental degradation; pollution; forest conversion, loss of biodiversity	SC5	IE	U	2
Logging-Small scale <b>D</b>	Alters microclimate; Damages resource base for some species; contributes to GHG emissions; increased sedimentation*	MC5	IT	F	3
Cultural values <b>I</b>	May lead to increased environmental degradation, pollution, and loss of biodiversity	Variable 0-7	LT	F	4
Shipping canals and ports <b>D</b>	Canal dredging destroys river communities; increases pollution	SC3	IE	N (for existing canals and ports)	6
Hydro-electric dam <b>D</b>	Eliminates entire ecol. com. through flooding; alters hydrological cycles; decreases fertility of alluvial plains downstream; interferes with reproduction and dispersal of marine fauna	SC5	IE	N (for existing dams)	6
Eco-tourism <b>D</b>	Increases pollution; may increase environmental degradation; may disturb sensitive species	LC5	LT	F	6

\*increased sedimentation is due to erosion of topsoil. End results are reduced fertility and productivity on land and decreased aquatic / marine productivity.

## **Annex VI. Actions Deemed Necessary by GOI to Conserve Biological Diversity and Tropical Forests**

*“Objective 1: To develop the quality of Indonesian individuals and society who are concerned with the conservation and sustainable use of biodiversity.*

Policy Direction: Improve the ability of communities in conducting sustainable and equitable management of biodiversity based on local knowledge and wisdom, supported by an easy access to accurate data and information on the functions and potentials of biodiversity, their distribution and abundance, etc., and by equitable and profitable trade and pricing system.”

### **Major Actions**

- Environmental awareness and outreach to achieve common perception and understanding to multiple stakeholders at all levels of society.
- Improve effectiveness of the management of conservation areas through partnerships and participation of local communities.
- Increase the capacity of communities regarding biodiversity management.
- Develop policies and regulations for the protection of indigenous knowledge in biodiversity management.
- Develop partnerships in the management, utilization and conservation of biodiversity between the national, provincial, and district/city government, the community and private sector.
- Develop, train instructors, and integrate biodiversity science and technology curriculum for elementary and secondary schools, and for vocational trainings.
- Improve enforcement relating to biodiversity management and conservation through extension activities and legal avenues.
- Identify biodiversity issues in the private sector and prepare best business practices guidelines based on sustainable and balanced biodiversity management.

*“Objective 2: To strengthen resources for supporting the development of science, technology and the application of local wisdom for the conservation and sustainable use of biodiversity.*

Policy Direction: To improve and expand the research and development of sustainable biodiversity science and technology, with widespread dissemination of network of biodiversity information and partnership.”

### **Major Actions**

- Basic and applied research on endemic and indigenous fauna and flora species, sustainable biodiversity use, and socio-cultural aspects related to sustainable biodiversity management.
- Map agroecosystem areas and document biodiversity potential.
- National census on the state of biodiversity and its potential.
- Map coastal zones, small islands (starting with Nusra and Maluku), and marine biodiversity, including seagrass, and document damage and potential.
- Maintain existing germplasm collections, and expand regionally.
- Map and revise boundaries of Biosphere Reserves.
- Document best practices in sustainable biodiversity utilization, including site-specific applications.

- Develop funding strategy for biodiversity conservation and management through incentives, the reforestation fund, community funds, and environmental taxes.
- Facilitate local IBSAP preparation and support implementation of the existing biodiversity strategic plan in West Nusa Tenggara and Papua.
- Develop a business investment concept for sustainable and equitable biodiversity management.
- Map karst ecosystems and their potential starting from the Sulawesi bioregion.
- Develop diversified community-based businesses based on the sustainable management of non-timber forest products.

*“Objective 3 To reduce and stop the rate of biodiversity degradation and extinction at the national, regional and local levels within the 2003-2020 period, along with rehabilitation and sustainable use efforts.*

Policy Direction: To improve and preserve ecosystem functions and balance at local, regional, and national levels that ultimately lead to the welfare of the people as the realization of the competitive advantages of Indonesian economy in both domestic and global markets.”

#### **Major Actions**

- Develop program for national biodiversity conservation and rehabilitation.
- Restructure policies in granting forest management rights and prohibition of natural forest conversion, taking into consideration the needs of the local/indigenous communities.
- Reforestation and forest rehabilitation programs using various local species.
- Enhance protection of coral reefs by controlling destructive fishing activities and banning coral reef mining.
- Restock fish fry and conserve threatened fish species and other marine biota
- Rehabilitate and prevent the degradation of sea grass.
- Prevent wetlands conversion and rehabilitate wetlands ecosystems.
- Prevent and control erosion of coastal areas and rehabilitate coastal ecosystems.
- Implement the Jakarta Mandate (under the CBD) on coastal and marine biodiversity conservation.
- Formulate and implement a strategic action plan for the sustainable management of biodiversity in small islands, starting with Nusra and Maluku.
- Improve the effectiveness of protected area management and conservation on small islands.
- Prevent marine ecosystem pollution due to disposal of tailings from mining activities.

*“Objective 4: To empower institutional, policy and law enforcement arrangement at the national, regional, local, as well at customary level so as to be effective and conducive for the management of biodiversity in a synergic, responsible, accountable, fair, balanced and sustainable manner.*

Policy Direction: 1. To build sustainable economy based on environmentally and socially friendly technology, and the protection and respect of local traditional community.  
2. To develop sustainable and fair biodiversity management system based



on local knowledge, tradition and good governance.

3. To build and to develop effective institutional arrangement and policies at national and local levels, accompanied by effective law enforcement and in conformity with international agreements on biodiversity management.

4. To enhance deconcentration and decentralization of government authority in biodiversity management to local government and community.”

### **Major Actions**

- Develop policy for environmentally friendly and sustainable economic development.
- Restructure forest-based industry to control illegal logging and harvesting of flora and fauna, including endemic species, through improved forestry law enforcement.
- Develop timber harvesting levels and methods from natural forest based on ecosystem carrying capacity.
- Develop sustainable and community-based methods for the utilization of non-timber forest products.
- Improve national agricultural productivity and agribusiness through diversification of seed stock, fairer policy, and protection of farmers with respect to commodity pricing and supply access.
- Develop food crop agricultural system based on local agro-ecosystem and germplasm diversity for each bio-region.
- Control and prevent the spread of invasive species (wild or cultivated).
- Develop a policy to protect genetic resources.
- Develop and disseminate local and indigenous knowledge in sustainable agriculture.
- Improve law enforcement to protect conservation areas, including Biosphere Reserves.
- Improve law enforcement to prevent and control the over-harvesting and degradation of biodiversity outside conservation areas.
- Formulate and codify the legal status of Biosphere Reserves.
- Formulate a Natural Resources Management Law that will, if possible, include the management of and access to genetic resources, as well as equitable sharing of benefits arising from their utilization.
- Develop and disseminate guidelines for archipelago and bioregion based biodiversity management.
- Disseminate IBSAP documents.
- Develop capacity for biodiversity valuation by local government agencies.
- Enhance negotiating capacity at international negotiations on biodiversity.
- Improve coordination of CBD implementation, including coordination with relevant international agreements and programs on biodiversity (CITES, Ramsar, WHC, MAB).
- Develop institutional arrangements regarding sustainable development at the national and regional levels.

- Formulate the minimum service standards to be provided by local government for the management, utilization, conservation, and rehabilitation of biodiversity at local and regional levels.
- Improve local government capacity regarding the implementation of regional autonomy in environmental and biodiversity management.
- Harmonization strategic biodiversity plans between IBSAP and provincial/district strategic plans, starting with West Nusa Tenggara and Papua.
- Identify and develop traditional system/ adat agreement system for biodiversity protection.

*“Objective 5 To achieve fair and balance of roles and interests of Indonesian society, as well as to reduce conflict potentials among all relevant sectors in a conducive, synergic, responsible, accountable manner in the sustainable use and conservation of biodiversity.*

Policy Direction: To develop mechanisms for natural resources and biodiversity conflict resolution at local, national and international levels, which is consensus oriented, fair, mutually beneficial, transparent, responsible, and accountable.”

#### **Major Actions**

- Compilation and codification of laws for resolving conflicts over natural resources and biodiversity.
- Identify sources and document case studies of natural resource based conflicts.
- Strengthen organizations dealing with advocacy/mediation of conflicts over natural resources.
- Enhance capacity in conflict resolution negotiations over natural resources.
- Develop an early warning system for potential conflicts over natural resources.
- Identify sources of conflicts between human beings and wildlife, document case studies, and formulate guidelines to resolving problem.

**Appendix VII. USAID engagement in major activities identified by IBSAP to mitigate threats.**

<b>IBSAP Major Activities</b>	<b>USAID Engagement</b>
<b>“Objective 1:</b> To develop the quality of Indonesian individuals and society who are concerned with the conservation and sustainable use of biodiversity.	
<b>Major Actions</b>	
Environmental awareness and outreach to achieve common perception and understanding to multiple stakeholders at all levels of society	X
Improve effectiveness of the management of conservation areas through partnerships and participation of local communities.	X
Increase the capacity of communities regarding biodiversity management	X
Develop policies and regulations for the protection of indigenous knowledge in biodiversity management.	X
Develop partnerships in the management, utilization and conservation of biodiversity between the national, provincial, and district/city government, the community and private sector.	X
Develop, train instructors, and integrate biodiversity science and technology curriculum for elementary and secondary schools, and for vocational trainings.	
Improve enforcement relating to biodiversity management and conservation through extension activities and legal avenues.	X
Identify biodiversity issues in the private sector and prepare best business practices guidelines based on sustainable and balanced biodiversity management.	X
<b>“Objective 2:</b> To strengthen resources for supporting the development of science, technology and the application of local wisdom for the conservation and sustainable use of biodiversity.	
<b>Major Actions</b>	
Basic and applied research on endemic and indigenous fauna and flora species, sustainable biodiversity use, and socio-cultural aspects related to sustainable biodiversity management.	X
Map agroecosystem areas and document biodiversity potential.	X
National census on the state of biodiversity and its potential.	X
Map coastal zones, small islands (starting with Nusra and Maluku), and marine biodiversity, including seagrass, and document damage and potential.	
Maintain existing germplasm collections, and expand regionally.	
Map and revise boundaries of Biosphere Reserves.	
Document best practices in sustainable biodiversity utilization, including site-specific applications.	X
Develop funding strategy for biodiversity conservation and management through incentives, the reforestation fund, community funds, and environmental taxes.	X
Facilitate local IBSAP preparation and support implementation of the existing biodiversity strategic plan in West Nusa Tenggara and Papua.	
Develop a business investment concept for sustainable and equitable biodiversity management.	
Map karst ecosystems and their potential starting from the Sulawesi bioregion.	
Develop diversified community-based businesses based on the sustainable management of non-timber forest products.	X
<b>“Objective 3:</b> To reduce and stop the rate of biodiversity degradation and extinction at the national, regional and local levels within the 2003-2020 period, along with rehabilitation and sustainable use efforts.	

IBSAP Major Activities	USAID Engagement
<b>Major Actions</b>	
Develop program for national biodiversity conservation and rehabilitation.	x
Restructure policies in granting forest management rights and prohibition of natural forest conversion, taking into consideration the needs of the local/indigenous communities.	x
Reforestation and forest rehabilitation programs using various local species.	x
Restock fish fry and conserve threatened fish species and other marine biota	
Enhance protection of coral reefs by controlling destructive fishing activities and banning coral reef mining.	x
Rehabilitate and prevent the degradation of sea grass.	
Prevent wetlands conversion and rehabilitate wetlands ecosystems.	
Prevent and control erosion of coastal areas and rehabilitate coastal ecosystems.	x
Implement the Jakarta Mandate (under the CBD) on coastal and marine biodiversity conservation.	
Formulate and implement a strategic action plan for the sustainable management of biodiversity in small islands, starting with Nusra and Maluku.	
Improve the effectiveness of protected area management and conservation on small islands.	
Prevent marine ecosystem pollution due to disposal of tailings from mining activities.	
<b>“Objective 4:</b> To empower institutional, policy and law enforcement arrangement at the national, regional, local, as well at customary level so as to be effective and conducive for the management of biodiversity in a synergic, responsible, accountable, fair, balanced and sustainable manner.	
<b>Major Actions</b>	
Develop policy for environmentally friendly and sustainable economic development.	x
Restructure forest-based industry to control illegal logging and harvesting of flora and fauna, including endemic species, through improved forestry law enforcement.	x
Develop timber harvesting levels and methods from natural forest based on ecosystem carrying capacity.	x
Develop sustainable and community-based methods for the utilization of non-timber forest products.	x
Improve national agricultural productivity and agribusiness through diversification of seed stock, fairer policy, and protection of farmers with respect to commodity pricing and supply access.	
Develop food crop agricultural system based on local agro-ecosystem and germplasm diversity for each bio-region.	
Control and prevent the spread of invasive species (wild or cultivated).	
Develop a policy to protect genetic resources.	
Develop and disseminate local and indigenous knowledge in sustainable agriculture.	
Improve law enforcement to protect conservation areas, including Biosphere Reserves.	x
Improve law enforcement to prevent and control the over-harvesting and degradation of biodiversity outside conservation areas.	x
Formulate and codify the legal status of Biosphere Reserves.	
Formulate a Natural Resources Management Law that will, if possible, include the management of and access to genetic resources, as well as equitable sharing of benefits arising from their utilization.	

<b>IBSAP Major Activities</b>	<b>USAID Engagement</b>
Develop and disseminate guidelines for archipelago and bioregion based biodiversity management.	x
Disseminate IBSAP documents.	
Develop capacity for biodiversity valuation by local government agencies.	x
Enhance negotiating capacity at international negotiations on biodiversity.	
Improve coordination of CBD implementation, including coordination with relevant international agreements and programs on biodiversity (CITES, Ramsar, WHC, MAB).	x
Develop institutional arrangements regarding sustainable development at the national and regional levels.	x
Formulate the minimum service standards to be provided by local government for the management, utilization, conservation, and rehabilitation of biodiversity at local and regional levels.	x
Improve local government capacity regarding the implementation of regional autonomy in environmental and biodiversity management.	x
Harmonization strategic biodiversity plans between IBSAP and provincial/district strategic plans, starting with West Nusa Tenggara and Papua.	
Identify and develop traditional system/ adat agreement system for biodiversity protection.	x
<b>“Objective 5:</b> To achieve fair and balance of roles and interests of Indonesian society, as well as to reduce conflict potentials among all relevant sectors in a conducive, synergic, responsible, accountable manner in the sustainable use and conservation of biodiversity.	
<b>Major Actions</b>	
Compilation and codification of laws for resolving conflicts over natural resources and biodiversity.	
Identify sources and document case studies of natural resource based conflicts.	
Strengthen organizations dealing with advocacy/mediation of conflicts over natural resources.	x
Enhance capacity in conflict resolution negotiations over natural resources.	
Develop an early warning system for potential conflicts over natural resources.	
Identify sources of conflicts between human beings and wildlife, document case studies, and formulate guidelines to resolving problem.	x

## **Appendix VIII. Potential Actions to Mitigate Threats**

Potential actions for USAID are organized based on the GOI objectives provided in the National Biodiversity Strategy and Action Plan. A brief rationale is provided for each major activity, followed by potential recommendations. Additional recommendations that do not fit into this framework are presented at the end of the section. The actions below can be undertaken by several offices within the Mission.

*“Objective 1: To develop the quality of Indonesian individuals and society who are concerned with the conservation and sustainable use of biodiversity.”*

### **Communities and Natural Resource Management**

Community members are increasing participation in natural resource decision-making processes, but are often not fully informed participants, and may not always benefit from programs.

Potential Recommendations:

- a) Educate community members on basic ecological principles, sustainable natural resource use, and policy formation. USAID should support the involvement of community members, through their representatives, in policy-making processes at the local level.
- b) Roles, responsibilities, and limits to authority of communities should be clearly defined in advance, along with defined consequences for failure to comply.
- c) Identify low or no-cost incentives to increase community participation.
- d) Natural resource use should be monitored by a variety of mechanisms, including communities, outside agencies, and large scale satellite-based monitoring.
- e) Increase local retention of profits through market assistance, microcredit for development of economic alternatives, PES, REDD, and other alternative financial mechanisms. PES and REDD should be performance based payments, and should go to community development funds, as opposed to individuals.

### **Local Institutional Capacity (Government and NGO/CBO)**

Local institutional capacity is increasing slowly, but it needs support. There is a general lack of knowledge and sensitivity regarding environmental issues. Technical and organizational systems and skills are required. In many regions, this results in inadequate budget allocation for environmental protection and non-sustainable rates of natural resource extraction to raise revenues. NGOs still have little impact on decentralized natural resource management processes, particularly in the coastal marine sector.

Potential Recommendations:

- a) Provide technical and organizational management assistance to NGOs, user groups, and local GOI in monitoring and evaluation, budgeting, reporting, financial plans, project cycle management, strategic planning, environmental monitoring, and environmental knowledge, etc.
- b) Promote a locally run resource pool center that provides mentoring, information, and tools supporting local governance in natural resource management to NGOs. USAID should encourage NGOs to scale-up project success stories and integrate them into local development policies.

- c) Establish a small-grants program. Tie grant receipt to participation in an on-going support program, with grant monies delivered in tranches contingent upon participation and completion of milestones.
- d) Expand the successful field school concept to improving management of both forest and coral reef ecosystems and resources. Water was identified by the ESP project as an extremely potent entry point for engaging rural communities in the wider enterprise of sustainably managing their natural resources base.
- e) Increase the depth of environmental knowledge and governance capacity of local GOI officials. Conduct a training needs assessment to identify specific requirements. Provide overseas graduate training for key or promising officials.

### Institutions and Communities

The concept of natural resource governance built on innovative multi-stakeholder institutional arrangements has not been institutionalized. Legal institutions are not trusted by communities.

Potential Recommendations:

- a) Nurture and strengthen innovative institutional arrangements at the regional and local levels. USAID should help develop mechanisms for regional and local 'champions' (NGOs, local academicians, and local government officials) to build collaborative programs.
- b) Ensure that multi-stakeholder institutional agreements are the foundation of continuous learning for sustainable collaborative management. USAID should encourage all stakeholders to develop natural resource management agreements that are sustainable environmentally, and incorporate political, economic, and socio-cultural development. This can be done through providing balanced information to all stakeholders to reduce existing gaps in knowledge.
- c) Promote transparency and public oversight of legal institutions.
- d) Help governments, private sector, and local communities understand existing legal regulations and frameworks.

*“Objective 2: To strengthen resources for supporting the development of science, technology and the application of local wisdom for the conservation and sustainable use of biodiversity.”*

### Increased Information Access

USAID has extensive experience in developing knowledge networks and disseminating information.

Potential Recommendations:

- a) Building upon existing government and NGO web-sites, build a web-based internet portal that provides unified access to environmental information and remote sensing (SERVIR model) at the district level.
- b) Make technical reports more accessible by translating them into policy briefs and present them orally to appropriate government officials.

*“Objective 3 To reduce and stop the rate of biodiversity degradation and extinction at the national, regional and local levels within the 2003-2020 period, along with rehabilitation and sustainable use efforts.”*

## Forestry

The majority of the forestry work conducted by USAID has focused on resource valuation, protected area financing, and timber certification. The forestry sector is over-harvested due to a number of factors including increasing demand for revenues (local) and foreign capital to pay down debt (national), over-capacity of timber and pulp mills, poor enforcement of regulations, and economic policies that under-value resources and allow for externalization of costs. As the majority of the timber is used either domestically, or within the Asia market, little timber enters eco-sensitive markets in Europe, the U.S. and Canada. Certification efforts have had limited success within Indonesia, despite interest on the part of several NGOs and some timber companies. There are new efforts through the Voluntary Partnership Agreement and proposed “Due Diligence” legislation for the EU, in coordination with the revision to the Lacey Act, which may add new impetus for market led reform.

### Potential Recommendations:

- a) Promote performance bonds for both individual and corporate logging operations; post holdings locally with the bond forfeited to local education or health fund for violations.
- b) Strengthen the capacity and motivation of a wider range of mid-level MoF staff that are unlikely to be changed to help promote adherence to GOI promises concerning sustainable forestry practices.
- c) Concentrate analyses on demonstrating financial incentives for sustainable forestry policy and practices and proper valuation of timber resources, particularly focusing on the need to maintain a permanent forest estate.
- d) Promote enforcement of existing regulations such as minimum dbh (tree diameter), number trees harvested per hectare, and the area set aside in concessions for maintaining a seed bank.
- e) Increase market incentives for sustainable forestry practices at both the community and commercial levels.
- f) Support reforestation/land reclamation efforts through technical assistance and provision of seed stock and equipment.
- g) Promote non-timber sources of pulp fiber to reduce pressure on the forest estate.
- h) Promote reclamation of alang alang grasslands by communities through reforestation or the planting of pulp fiber alternatives, such as kenaf.
- i) Assist LEI to become aligned with either FSC or PEFC certification systems, as opposed to promoting international recognition. LEI should then develop the national standards for either the FSC or the PEFC system for Indonesia.
- j) Build private sector, local government, and community capacity to understand trade regulations, the Indonesian National Scheme, and the timber export verification system.
- k) Establish a regional service provider to raise local capacity for sustainable forest management, watershed protection, and REDD.

USAID has provided high quality maps and technical assistance on institutional coordination and fire fighting. Indonesia’s forests continue to be at high risk, however, from large-scale fires due to degradation, continued conversion to plantations, the threat of arson, and negative climate change impacts.



#### Potential Recommendations:

- a) Increase the financial incentives for best practices by communities and reduce the risk of arson by strengthening co-management of the forest estate and implementing “payment for environmental services” (PES) or the use of carbon credits (voluntary market or REDD).
- b) Capture GTZ fire management outcomes and incorporate in publications and policy.
- c) Promote implementation of PP4/ 2001 regarding responsibilities of concession holders with respect to fire control and management.
- d) Restore hydrological functions in peat swamp to reduce fire risk.
- e) Incorporation of adaptation measures into forestry management to improve resilience.

#### National Parks

USAID activities have had little impact on wide-spread illegal activities degrading terrestrial parks, primarily because there have been no sustainable revenue stream for management or financial incentives developed for local communities. Current REDD regulations exclude national parks, except for use zones. Marine park interventions by USAID have been more successful, primarily because interventions have directly benefited local communities (i.e., fish sanctuaries increase the adjacent catch). There is a huge gap here in donor support, and this provides an opportunity for USAID.

#### Potential Recommendations:

- a) Expand upon the model provided by the Marine Sports Associations at Bunaken National Park to both terrestrial and marine parks. Facilitate actions and programs such as diving/hiking safety, codes of conduct, promoting environmental activities, providing emergency or out-of-the-ordinary back-up for the Park, and dive operator (Blue/Green Star) environmental standing as model of private sector partnership to other parks.
- b) PHKA would like support for a REDD project. Policy support could be provided to amend current GOI regulations, and allow national parks to be included.
- c) PA boundaries should be re-evaluated to make sure that they contain viable populations, connecting corridors, and will continue to protect biodiversity and forests given potential shifts in species range and distribution due to climate change.
- d) Provide additional technical assistance and required equipment for rangers and community members.
- e) Strengthen co-management systems for PAs, including joint patrols where appropriate.
- f) Promote the establishment of alternate conservation financing mechanisms, e.g. dive tags, DFNS, PES, carbon credits, and trust funds.
- g) Promote the establishment of incentive systems for rangers.
- h) Keep trusted and familiar brokers as USAID facilitators/advisors where possible.
- i) Support and expand the network of PA Management Councils, e.g., the Bunaken Management Council.

#### Spatial Planning

USAID efforts have laid the groundwork for effective planning in some districts and provinces (e.g. Papua) with appropriate set-asides for biodiversity and forest

conservation. Conflicts in administrative boundaries between some official maps has led to spurious claims and increased community conflicts.

Potential Recommendations:

- a) Obtain agreement on broad scale landscape issues (e.g. forest connectivity), at least at the district level, prior to planning at finer scales.
- b) Incorporate climate change models into spatial planning.
- c) Incorporate wildlife corridors and district/community parks/reserves/MPAs into spatial planning.
- d) Promote mapping of extant land use as the first step, separate from future development plans and legal claims.
- e) Educate GOI, NGOs, and communities on implications of land use decisions.
- f) Standardize best practices for community mapping. These practices should include deleting administrative boundaries from community maps, an emphasis on training communities to respect others rights, as well as their own, mechanisms to resolve disputes, and individual/community responsibilities. Community mapping should be viewed as an iterative process, with give and take between individuals, communities, local and provincial government.
- g) Incorporate these steps into coordinated district and provincial spatial planning.
- h) Provide technical assistance and capacity building to the local BAPPENAS office in support of Law 26, 2007.

#### Marine Sector

The Ministry of Marine and Fisheries (DKP) will be hosting the World Oceans Conference in May 2009 and plans to use this forum to reinforce their priorities, including the Coral Triangle. There is momentum to achieve mutual objectives, and assist the DKP in a number of areas.

Potential Recommendations:

- a) Provide technical assistance in the development and facilitation of a National Action Plan for the Coral Triangle Initiative, building upon lessons learned from the CRMP project and NGO conservation efforts.
- b) Provide meeting support for the World Ocean Conference, including facilitation, the publication of technical materials of relevance, and support for other USG presence.
- c) Provide technical support to DKP and local districts with respect to implementation of Law No. 27, 2007 regarding the Coastal Zone and Small Island Management.
- d) Support improved management of fisheries, threatened species, and coastal zones.
- e) Incorporate adaptation measures in the coastal/marine sector to improve resilience.

*“Objective 4: To empower institutional, policy and law enforcement arrangement at the national, regional, local, as well at customary level so as to be effective and conducive for the management of biodiversity in a synergic, responsible, accountable, fair, balanced and sustainable manner.”*

#### Enabling Conditions Necessary for Improved Natural Resource Governance

Widespread improvement of natural resource governance will not occur until the rule of law is followed throughout the nation, communities and GOI both accept responsibility and are held accountable for their actions, and there is genuine concern for environmental issues.

#### Potential Recommendations:

- a) Support efforts to increase enforcement of laws and regulations, transparency, public accountability, and informed community participation.
- b) Increase the strength and capability of the media to inform the public through training and workshops for journalists. Consider funding a talk radio show on environmental issues.
- c) Conduct national campaigns aimed at increasing concern, and changing attitudes and behavior.
- d) Increase the capacity of officials and institutions to deal with technical and policy issues (see below)

#### Regional Autonomy and National Law

The legal and political situation remains unclear. Central government control is weakened and/ or absent and there is a lack of critical capacity at the district level. The roles, relationships, and responsibilities of different government bodies and layers of government are poorly defined.

#### Potential Recommendations:

- a) Support awareness, capacity building, and public consultation mechanisms to develop a critical mass of effective advocates for sustainable natural resource use. In particular, strengthen support to District Task Forces, District Working Groups on Forestry, and civil society working with local parliament.
- b) Improve the capacity of the local GOI to draft appropriate laws and regulations, perhaps through an exchange program.
- c) Facilitate GOI's definition of its role and responsibilities through dialogue and organizational strengthening.

#### Political Will

There is little political will to take action, make decisions, or enforce existing laws by national, provincial, or district GOI.

#### Potential Recommendations:

- a) Pursue awareness campaigns, training and other activities that will establish necessary enabling conditions. Well-informed citizens will create demand for accountability, transparency and participation in the public policymaking processes. This activity will foster the establishment of critical mass.
- b) The web-based environmental portal should provide public information access, ability to monitor and evaluate environmental assets, and make informed environmental decisions regarding resource use.
- c) Train police, attorneys, and judges concerning natural resource and environmental issues in collaboration with other USG partners and other donors.

#### District Regulations (Perda)

As authorized by Law 22, numerous local ordinances have been developed, and revenue sharing mechanisms between central and local government are now in place. Indonesia's legal framework, however, remains weak and unclear. The central government still retains authority over the "use" of natural resources, despite the fact that local government has been given the authority to "manage" the natural resources. This has

resulted in confusion and disputes between central and local government, particularly given the lack of specified implementing regulations. Local ordinances have led to increased conflict between villages that have overlapping land/sea claims as jurisdiction is not clear. Severe environmental problems have been another potential outcome, as decisions concerning local ordinances are made independent of the larger ecological context. Re-designation of forest status by local districts is an emerging threat, with production forest being converted to oil palm and other agricultural purposes.

Potential Recommendations:

- a) Support efforts to clarify and strengthen the legal framework at the national, provincial, and district level. This should be considered as an important first step for the Mission.
- b) Incorporate consideration of common or “adapt” law if possible and appropriate.
- c) Increase public participation in the process of policy development.
- d) Support the design of village ordinances within a larger legal and ecosystem framework.
- e) Consider establishment of “working groups” from several contiguous districts to harmonize design and implementation of district regulations.

*“Objective 5 To achieve fair and balance of roles and interests of Indonesian society, as well as to reduce conflict potentials among all relevant sectors in a conducive, synergic, responsible, accountable manner in the sustainable use and conservation of biodiversity.”*

#### Institutionalizing Conflict Resolution Mechanisms

Widespread conflict exists, often over access and/or rights to natural resources. There is no appropriate system for resolving natural resource management conflict.

Potential Recommendations:

- a) Promote the incorporation of appropriate conflict avoidance, management and resolution strategies into natural resource governance (policies, programs, and projects).
- b) Agreement on dispute resolution mechanisms should be finalized prior to beginning of activities that may lead to conflict (e.g., spatial planning, mapping).
- c) Support the provision of conflict resolution training for local government and non-government agencies.
- d) Identify areas with the potential to serve as models for best practices for conflict resolution.

#### ***Other Recommendations***

##### Collaboration with other Donors

Both bi-lateral and multi-lateral donors are willing to cooperate and coordinate with USAID in order to increase effectiveness.

Potential Recommendations:

- a) Help establish protocols for cooperation and coordination among the donor community, particularly in the climate change sector.
- b) Establish and participate in a cross-sectoral donor’s forum.

### Increase Private Sector Involvement

Private sector investments in natural resources sectors dwarf both development assistance and government budgets, and are often the driving force determining the pace and nature of natural resource use. Global market pressures for sustainably-produced products and changing national policies are beginning to reshape the private sector. Given the right set of investment incentives/disincentives, information necessary for good decision-making, and access to appropriate technology and partners, some firms will become more socially and environmentally responsible.

Potential Recommendations:

- a) Develop and establish a cross-cutting center to assist private sector actors move towards responsible and sustainable investments activities.
- b) Provide technical assistance and outreach in a rapid flexible manner in exchange for specific corporate commitments regarding best practices or conservation set-asides.

## **Appendix IX. Potential Activity Descriptions**

### **A. Private Sector Facility**

Establish a cross-cutting center to assist private sector actors move towards responsible and sustainable investments activities. The proposed center would have a small core staff of long-term experts, but would work for the most part through a “floating” pool or roster of technical and business experts that could be mobilized, on a short-term, on-demand basis, to respond to opportunities as they arise. Specific activities might include:

1. Provide technical assistance and outreach in a rapid flexible manner in exchange for specific corporate commitments regarding best practices or conservation set-asides.
2. Build private sector, local government, and community capacity to understand trade regulations, the Lacey Act, the Indonesian National Scheme, and the timber export verification system.
3. Build private sector capacity to understand and invest in REDD or voluntary carbon markets. Keep and maintain a database of potential opportunities.
4. Assist LEI to become aligned with either FSC or PEFC certification systems, as opposed to promoting international recognition. LEI should then develop the national standards for the system for Indonesia.

### **B. Environmental Monitoring and Information Dissemination Website**

Building upon existing government and NGO web-sites, build a web-based internet portal that provides unified access to environmental information and remote sensing (SERVIR model: English: <http://servirtest.nsstc.nasa.gov/about.html>), Spanish version: [http://www.servir.net/index.php?option=com\\_wrapper&Itemid=128](http://www.servir.net/index.php?option=com_wrapper&Itemid=128), at the district level. The portal should provide public information access, ability to monitor and evaluate environmental assets such as forests, climate information and forecasting, and tools to make informed environmental decisions regarding resource use in order to reduce threats to biodiversity. Specific activities might include:

1. Provide training in the use of the web-based tools to local government, private sector and community leaders. (This could be done, in part, through the Regional Service Provider – see below)
2. Develop new tools and data sets.
3. Partner with NASA, Oak Ridge National Lab, and the Indonesian Meteorological Institute, to develop updated climate models for Indonesia.

### **C. The Regional Service Provider**

Establish a regional service provider in Papua, Kalimantan and Sumatra to raise local capacity for sustainable forest management, land use planning, watershed protection, and sustainable financing (e.g., PES, voluntary carbon market or REDD). The center should provide technical support and analyses, training, capacity building, and develop a business model to become sustainable by the end of the project. If possible, build upon existing capacity (such as a university or technical institute). Sample activities might include:

1. Provide technical and organizational management assistance to local government, NGOs, user groups, in business skills for microenterprise, monitoring and

- evaluation, budgeting, reporting, financial plans, project development and project cycle management, strategic planning, environmental monitoring, increasing environmental resilience, sustainable forest management, and environmental knowledge, etc. based on needs assessment and specific requests.
2. Provide technical assistance to re-evaluate PA boundaries to make sure that they contain viable populations, connecting corridors, and will continue to protect biodiversity and forests given potential shifts in species range and distribution due to climate change.
  3. Increase the capacity of officials and institutions to deal with technical and policy issues, such as REDD and the Indonesian National Scheme. Provide overseas graduate training for key or promising officials.
  4. Train police, attorneys, and judges concerning natural resource and environmental issues in collaboration with other USG partners and other donors.
  5. Help governments, private sector, and local communities understand existing legal regulations and frameworks.

#### **D. Site based activities in Papua, Kalimantan, and Sumatra**

Impoverished communities adjacent to forests in Papua, Kalimantan and Sumatra require assistance to adapt to climate change, and to reduce non-sustainable activities that are contributing to increased emissions. Develop a small-grants program for sustainable forest management in park buffer zones. Tie grant receipt to participation in an on-going support program run through the Regional Service Provider, with grant monies delivered in tranches contingent upon performance.

1. Promote reclamation of peatlands, along along grasslands, and upland watersheds by communities through technical assistance, provision of seedlings, and training. This could use the Civilian Conservation Corps as a model, with environmental revenue streams from CSR, Voluntary Carbon Credit or PES payments, providing start up costs. Native species that provide economic benefits (such as fruit crops) should be used in peat land and upland watersheds, with payments tied to performance and seedling survival. One option for along along grasslands is the planting of pulp fiber alternatives, such as kenaf, a fast-growing nitrogen fixer, to reduce pressure on the forest estate and improve soils.
2. Identify and incorporate adaptation measures into forestry management to improve resilience. This may include re-evaluations of sustainable yields for harvesting plans.
3. Promote the establishment of alternate conservation financing mechanisms for parks, protected areas, and restoration concessions, e.g. dive tags, DFNS, PES, carbon credits, and trust funds, as well as microcredit for sustainable economic alternatives in ecologically important areas.

#### **E. Coral Triangle Initiative**

The Coral Triangle Initiative is a new multilateral partnership to safeguard the region's marine and coastal biological resources. The Initiative has five regional goals:

Goal # 1: Priority seascapes designated and effectively managed.

Goal # 2: Ecosystem approach to management of fisheries (EAFM) and other marine resources fully applied.

Goal # 3: Marine Protected Areas (MPA) established and effectively managed.

Goal # 4: Climate change adaptation measures achieved.

Goal # 5: Threatened species status improving.

USAID Indonesia is buying into the RDMA mechanism to address threats to the coral reefs and marine/coastal areas located within the Coral Triangle. Support for the regional initiative will be limited to those efforts that overlap with USAID Indonesia priorities.

Specific activities might include:

1. Provide technical assistance in the development and facilitation of a National Action Plan for the Coral Triangle Initiative, building upon lessons learned from the CRMP project and NGO conservation efforts.
2. Provide technical support to DKP and local districts with respect to implementation of Law No. 27, 2007 regarding Coastal Zone and Small Island Management.
3. Develop appropriate policies, plans, regulatory guidelines and support the execution of improved ecosystems-based fisheries and a strengthened marine protected areas network in Indonesia
4. Provide technical support and capacity building to DKP to strengthen enforcement of legal regulations, and ensure that harvest levels are sustainable given potentially reduced productivity due to climate change.
5. Incorporate adaptation measures identified in the National Action Plan in the coastal/marine sector to improve resilience. These measures might include mapping vulnerability to climate change, protect multiple habitat examples to minimize risk, conserve areas that are inherently resilient as refuges for reseedling, maintain ecological connectivity, such as source/sink linkages, and reduce major non-climate stressors that decrease capacity to endure climate change impacts.



## **Appendix X. List of Contacts**

### **Government of Indonesia**

Togu Manurung, Advisor to the Minister, Ministry of Forestry  
Tonny Soehartono, Director of Biodiversity Conservation, Ministry of Forestry  
Agus Purnomo, Head of Secretariat, National Council for Climate Change  
Liana Bratasida, Assistant Minister for Global Environmental Affairs and International Cooperation, Ministry of Environment  
Wahjudi Wardoyo, Head of Forest Research, Ministry of Forestry  
Masnellyarti Hilman, Deputy Minister for Nature Conservation Enhancement and Environmental Degradation Control, Ministry of Environment  
Heddy Suhandi Mukna, Ass't Deputy for Forest and Land Degradation Control, Ministry of Environment

### **Non-Governmental Organizations**

A. Ruwindrijarto, Director, Telapak Indonesia  
James Jarvie, Climate Change Director, Mercy Corps  
Jatna Supriatna, Executive Director, CI Indonesia  
Daniel Juhn, Director Regional Analysis Program, CABS, CI  
Ani Mardiasuti, Chair of the Board, Burung Indonesia  
Frank Momberg, Regional Director of Program Development, FFI  
Lex Hovani, Forest Carbon Advisor, The Nature Conservancy

### **Private Sector**

Effendy Sumardja, President Director, PT. Restorasi Ekosistem Indonesia  
Titie Sadarini, Corporate Affairs Director, Coca Cola  
Triyono Prijosesilo, Public Affairs Manager, Coca Cola  
Agus Sari, Country Director, EcoSecurities  
Arif Hasyim, Country Director, asiaBIOGAS  
Yanti Koestoer, Indonesia Business links  
Canecio Munoz, Executive Director, SINARMAS

### **Donors**

Josef Leitmann, Environmental Coordinator, Resident Mission in Indonesia, World Bank  
Timothy Brown, Senior Natural Resources Management Specialist, World Bank  
Adrian Wells, Advisor on Climate Change and Forestry, DFID  
Timothy Jessup, Technical Advisor, Forestry (Australian government consultant)  
Damiyanti Buchori, Executive Director, KEHATI  
Anida Haryatmo, Program Director, KEHATI  
Ujjwal Pradhan, Program Officer, Ford Foundation  
Thibaut Portevin, Program Manager, EU  
Andy Roby, FLEGT VPA Facilitator, DFID and EU  
Rolf Krezdorn, Forestry Advisor, GTZ  
Georg Bucholz, Principal Advisor, GTZ  
Budhi Sayoko, Assistant Resident Representative, UNDP  
Lukas Laksono Adhyakso, Program Officer, UNDP

**International Research Institutions**

Frances Seymour, Director General, CIFOR  
Markku Kanninen, Director, Env.l Services and Sustainable Use of Forests, CIFOR  
Daniel Murdiyarso, Principal Scientist, CIFOR  
James Roshetko, Leader Trees and Market Unit SE Asia, ICRAF  
Meine van Noordwijk, Sr. Scientist, ICRAF

**USAID Projects**

William Parente, Chief of Party, ESP  
Reed Merrill, Deputy Chief of Party & Watershed Management Advisor, ESP  
Paul Hartman, Director, OCSP  
Darrell Kitchener, Technical Advisor, OCSP  
Kim DeRidder, Chief of Party, SERASI  
Keith Hargreaves, Deputy Chief of Party, SERASI  
Pradeep Tharakan, Deputy Chief of Party, RDMA consultant  
Jerome Weingart, Senior Biofuels Specialist, RDMA consultant

**USAID Staff**

Orestes Anastasia, Regional Environment Advisor, RDMA  
Colin Green, Climate Change Specialist, USAID EGAT/ESP/GCC  
Jeffrey Haeni, Rural and Renewable Energy Specialist, USAID EGAT/Energy Team  
Alfred Nakatsuma, Office Director, BHS  
Katherine Valdez, Water and Environment Team Leader, BHS  
Suzanne Billharz, CTO, BHS  
Priyanto Santoso, CTO, BHS  
Tri Linggoatmodjo, CTO, BHS  
Charles Oliver, Health Team Leader, BHS  
Christopher Edwards, Director, Program Office  
John Packer, Monitoring and Evaluation Advisor, Program Office  
Walter North, Mission Director  
Alan Lewter, Deputy Director, Executive Office  
Veeraya Somvongsiri, Office Director, Democracy and Governance  
Jason Singer, Office Director, Millenium Challenge Corporation  
Arturo Acosta, Office Director, Education

**Other**

LeRoy Hollenbeck, Director Asia, Chemonics (WB consultant)  
Stacey Tighe, Marine Consultant (USAID consultant)  
Igino Emmer, Director, Emmer International (UNDP consultant)  
Johan Kieft, Senior Manager, Climate Change, GRM Int. (UNDP consultant)